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dylan\_armbrust@vnu.co.uk

Editorial

# Talk more, pay less by joining the Voice over IP revolution

*Using the Internet to make phone calls is becoming mainstream and you save cash too, says Dylan Armbrust*

**H**ow do you know when a technology has become mainstream? When it starts being promoted by a supermarket. This may sound like an odd opening to the editor's column in a computer magazine, but it's one, I think, that's apt. My question refers to the fact that Tesco has decided to join the Voice over IP (VoIP) revolution with its Tesco Internet Phone service. Supermarkets aren't renowned for their risk-taking when it comes to what they sell, and this is even more true with any product that's remotely technical.

So I was pleasantly amused, but not surprised, when Tesco announced it was getting into the VoIP game. It makes sense because, of course, it makes money. But more importantly it's an acknowledgement of two key trends. First, that broadband is widespread among its customers across the UK and to make good use of VoIP you need a decent broadband connection. The second trend, although this is perhaps more of a bet on Tesco's part, is that VoIP will overtake public switched telephone networks (PSTNs) – what we'd normally call a landline.

Some may say it is a bit rich to make a prediction so early in the VoIP game, but you have to sit up and take notice if a player like Tesco aligns itself with what is effectively a nascent technology. The fact is that it isn't really mainstream. A recent Ofcom report found that with over 15.5 million Internet connections in the UK, only nine per cent of Internet users made use of VoIP. That's not a lot – yet.

But awareness of VoIP is high. Ofcom's Interim Report into the UK's Communications Market found that 49 per cent of UK telecoms customers are aware of VoIP and it rises to 59 per cent of Internet users and 63 per cent of broadband users. Whatever way you interpret the figures, it is clear there is a new telecoms market to be tapped. It's only a matter of time before a tipping point is reached and we find a mass move to VoIP services in the home and at work. So it's easy to see Tesco's logic in offering the service.

Tesco isn't the only one banking on VoIP being a money-maker. Ebay put up \$2.6b (£1.48b approx) to buy Skype last year, so there's a lot of confidence in the technology, even if there isn't a lot of revenue at the moment. And that's why our main cover feature *Talk more, pay less* (see page 98) is so relevant. I believe that even though relatively few people use the technology today, that will soon change for one simple reason: VoIP is cheap. All you need is an Internet connection, ideally a broadband one. Many services don't even require you to have a PC, as they provide an adapter that plugs straight into the phone socket. The reality is, however, that if you have a broadband connection you will most likely have a PC too, but that's not really the point, is it?

Our comparison table on page 102 shows that the cost of calls is extremely competitive and there are real savings to be made. Of course, there are limitations at the moment, the biggest being that most services don't offer the ability to call the emergency services. Another is that sometimes call quality can be a bit ropery. But with the way things are moving I suspect it won't be that long before these issues are resolved.

So if you're interested in VoIP, but haven't got around to giving it a whirl I recommend you do, as I think you'll be pleasantly surprised at how easy it is to use and you'll save money too. **PCW**

**'You have to take notice if a player like Tesco aligns itself with a nascent technology'**

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**see page 182**

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**see page 186**

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FOR A LISTING OF SOFTWARE TURN TO PAGE 181

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# NEWS

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## Origami's March of progress

Last month's Cebit got a bad press. The world's biggest computer show is getting smaller, they said. Big players stayed away and it is in danger of splintering into specialist shows.

Nevertheless, Cebit 2006 was the most interesting I have attended – and I have been to just about all of them in the past decade. It was the time, as much as the show. March, in my opinion, was the most exciting month in computing since the advent of Mosaic, the first successful graphical browser, marked the start of the web age in 1993.

Most Mosaic users knew that the browser would change the world and bored everyone they knew trying to explain why. A change just as fundamental is happening again: technology is getting to the point where we can create a computer as portable as a paperback with the power and communications of a desktop.

This has required developments across a range of technologies, including those needed to sustain



Samsung Q1 ultra-mobile – see also page 16

the ecosystem of a device that will draw many of its resources from the network. Just take a look at what has been happening:

- Intel announced a new power-efficient core microarchitecture (see story below).
- Next-generation Wifi (see page 20) and data-over-mains (see page 15) are offering local links of the order of 100Mbps/sec. Bluetooth and Certified Wireless USB, using ultra-wideband (UWB) carriers, promise shorter radio links with a data rate of up to 480Mbps/sec (see page 21).
- The first mobile Wimax product (see page 20) promises roaming wide-area access at up to 9Mbps/sec.
- Samsung showed a 32GB Flash disk, enabling a solid-state laptop. Panasonic says its HCSD cards will have similar capacity (see page 17).
- Vendors are trying to 'seed' Europe with **devices capable of receiving broadcast data** using mobile-optimised DVB-H or DMB, the multimedia version of the DAB digital radio signal. This will allow you to receive TV, multimedia newspapers and other content on the move.
- **Network infrastructure across Europe is being upgraded**, sometimes from century-old circuit switching, to use the packet-switched Internet Protocol (IP). At the user level, this is reflected in the increase of web calls; VoIP handsets abounded at Cebit.
- BT said 96 per cent of UK exchanges have been upgraded to offer web access at up to 8Mbps/sec (see page 15).
- The first ultra-mobiles using the Origami version of Microsoft's Tablet PC interface were shown at Cebit (see page 16) and IDF (see page 22).

Ultra-mobiles are in their infancy and may evolve as much from games consoles as from Microsoft's Origami concept. Early models are likely to be underpowered and all the technologies involved need to mature – so does the interface.

Some developments may be dead ends; but my hunch is that there will come a point soon in the future when people will have to have a mobile (the 'ultra' is surely superfluous) because the devices will be central to the way they operate. The social and cultural ramifications, let alone the technological ones, will be enormous. That's why, when I first looked at an Origami at Cebit, I got the same shiver down my spine that I felt when I first loaded Mosaic. *Clive Akass*

### More news online

You'll find many more stories from Cebit and IDF on our website. Go to [www.pcw.co.uk/2153354](http://www.pcw.co.uk/2153354) for further information on the words coloured blue, plus more stories and insights.

## Core for frugal chips

A new processor core microarchitecture will increase performance by 40 per cent, while reducing power drain by 40 per cent compared with today's Pentium D 950, Intel said. This will lead to dual- and quad-core processors 'that we expect to deliver industry-leading performance and capabilities per watt', chief technology officer Justin Rattner told the Intel Developer Forum (IDF). The gains will be achieved by doing more work per clock cycle, powering down logic that is not being used, and more intelligent use of cache memory and Ram. *Rob Jones*

→ Processor roadmap and other IDF news – see pages 22 and 23

→ Origami design, page 16

# Vista delay could boost Macs

Microsoft has delayed the release of consumer versions of its next-generation office suite and operating system until early next year, which means any PC bought for Christmas will be out of date immediately. Enterprise versions will be available on schedule later this year.

The company is negotiating with vendors about the terms for upgrading new purchases to Office 12 and Vista when the software becomes available. This raises issues about who is going to do the upgrades and who is responsible if software runs on XP but not Vista.

Users will have just begun to learn one set of software when they will be faced with a new one: the Office 12 and Vista interfaces are different from their predecessors.

PC sales over the peak Christmas period are certain to be

affected and the delay could be a major opportunity for Apple to cut into Microsoft's sales.

The success of the Ipod has raised Apple's profile in the consumer market and you can buy a Mac Mini for the same price as an entry-level PC. And the iLife suite of family-oriented applications bundled with Macs beats anything that comes with Windows – although, like the Ipod, it locks users into buying content and services from Apple to an extent Microsoft could never get away with.

Conspiracy theorists could read much into another bombshell from Microsoft last month. Development manager Andrew Ritz, during a panel discussion at IDF (Intel Developer Forum), let slip that the launch version of Vista will not support the Extensible Firmware Interface (EFI), designed to replace

the Bios module containing code that boots up basic PC functions before the operating system loads.

As we explained last month (PCW May 2006, p114), EFI is more versatile and will enable faster boot-ups. Peripherals vendors also need provide only one software driver for EFI machines, regardless of operating system.

The new Intel-based Macs use EFI, so if Windows PCs go the same way, the two platforms will no longer need separate drivers – removing at a stroke a disadvantage of Macs, which is that fewer peripherals are available for them.

EFI support in Windows would also make it easier for users to run the operating system on Intel Macs, getting the best of both worlds. Any suggestion that these facts are connected with the EFI delay is, of course, pure conjecture.

## GPS camera logs locations

Navman has introduced two satellite navigation products, the ICN720 and ICN750, with a built-in camera that automatically registers the co-ordinates of the site of any picture taken.

Professional applications of 'Navpix' include surveys, accident reports and travel guides. Navman plans to post Navpix of famous places on its website.

Navpix could also be useful for non-business purposes, such as photographing tricky turnings when you are sending directions to someone; even with GPS it is easy to overshoot a lane with no signpost.

Location data is stored as standard jpeg metadata, easily accessible by other software applications. Both the products have a 4in navigation screen and are



designed to go in cars. The ICN720, which has only UK data, costs £399, and the ICN750, which includes data on 17 European countries, costs £549. Both prices include VAT.

→ [www.navman.com](http://www.navman.com)

## BT upgrades UK to 8Mbps/sec (if you're lucky)

BT has upgraded exchanges across the country to DSL max, offering access speeds of up to 8Mbps/sec – data rates will depend on your distance from the local exchange and the quality of the line. Upstream speeds, previously 256Kbits/sec, are upgraded up to 448Kbits/sec or 832Kbits/sec for people paying business rates. This makes video calls and content streaming more viable.

Most users are likely to get the increase for free, although charges will be set by service providers, many of whom resell BT bandwidth.

Plusnet said all existing customers will get the faster services for no extra charge. Nildram is upgrading customers for free, but only if they sign up online for a 'regrade', said a spokeswoman. BT Retail said all its customers will be upgraded this

spring at no charge, although the timetable will depend on the package they have signed up to.

Freedom2Surf announced a £13.99-a-month pay-as-you-go 8Mbps/sec service for light users. It is capped at 500MB, enough for most email inboxes, with a 99p charge for each extra 1GB.

BT plans to offer IPTV services over its newly upgraded lines.

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## In brief

### UK Wimax move

Intel and Pipex have signed a deal to establish high-speed Wimax networks in major UK cities in 2007 and 2008. See [www.pcw.co.uk/2153328](http://www.pcw.co.uk/2153328) for more information.

### 200Mbit mains

Instant home networks using mains wiring and rated at 200Mbps/sec will be available in Britain before summer – but predictably with a choice of three conflicting technologies. All provide an Ethernet link simply by plugging an adapter into the mains, and real data throughput is likely to vary between 70Mbps/sec and 150Mbps/sec. For more on this story go to [www.pcw.co.uk/2151772](http://www.pcw.co.uk/2151772).

### PC tax plea

Tory Shadow Chancellor George Osborne has called on Gordon Brown to reverse his decision to scrap the Home Computer Initiative (HCI), which allowed people to get computers through their employers with a tax break that effectively cut the price by 40 per cent. Read more on this at [www.pcw.co.uk/2153283](http://www.pcw.co.uk/2153283).

## Home help

There's an updated interactive tool on the website of our sister publication Activehome to help you plan your digital home, with a network enabling you to share content and other information between TVs, set-top boxes, PCs and wirelessly connected devices such as laptops. Check it out at [www.activehome.co.uk](http://www.activehome.co.uk).





# £350 ultra-mobiles are on the cards

**S**amsung's Q1 Origami was the most sophisticated and expensive ultra-mobile shown at Cebit, with prices cited between \$1,000 (£573 approx) to \$1,500 (£860 approx). It was also the heaviest, at 1kg.

But chip designer Via said ultra-mobile PCs using its new low-drain C7-M ULV (ultra-low voltage) processor could sell for \$600 (£344 approx) or less, putting them in competition with PDAs.

The C7 is a descendant of the Centaur x86 chip, which was

bought out by Via. Keith Kowal, marketing manager of Via's chipset platform group, said the 1GHz C7-M ULV drains a maximum of 3.5w, and the 1.5GHz version 5w, the maximum for the ultra-mobile's thermal design.

At least three ultras using the Via chip were on show at Cebit, but unless the C7 goes dual-core it is hard to see it keeping up with Intel on performance per watt.

Asus, Gigabyte and ECS all showed Intel-based Origamis. The Asus R2H had a built-in camera,

enabling it to be used for video calls or taking snapshots – something likely to become standard for this format. It also has a Pal TV module and a fingerprint sensor.

These three companies were remarkably coy about their ultra-mobiles at Cebit. You had to look carefully to find the machines: I spotted the Asus by accident. Not all reporters share my faith in tablets, so perhaps the companies feared a bad press.

Not so Samsung, which flourished its Q1 at every

opportunity. It has a DMB receiver (see page 14), a 7in screen and offers a choice of low-drain Celeron or Pentium M processors. It has a flipout support at the back so that it can stand on edge.

Samsung has built a peripheral kit around it, including a keyboard and DVD drive, all packed into a small wallet. Connecting with peripherals such as this is the kind of task UWB links will be good for (see page 21): low range, low power, high data rate and no wires so you don't need to plug things in.



## Q1 by numbers

- 1 Power switch; 2 Reset;
- 3 CF/II card slot; 4 Ethernet port;
- 5 Pull-out DMB aerial; 6 VGA port;
- 7 USB2 port; 8 DC in;
- 9 Stereo speaker; 10 8-way joystick;
- 11 Auto-scaler for high-res websites;
- 12 Array mics; 13 Stereo speaker;
- 14 8-function user-definable key;
- 15 Enter key; 16 Menu key;
- 17 USB2 port (socket above for extra DVD drive power);
- 18 Audio jack; 19 Volume;
- 20 Hold switch;
- 21 Hand strap connector

## What will be the making of a true portable?

The truly portable computer is one of today's most fascinating design challenges, with aspects ranging from high fashion to nanoscale electronics.

Fashion comes in because we may have to design bags or clothes around whatever turns out to be the most popular format: men's pockets have hardly changed since Edwardian times, when their size was dictated by that of a cigarette case or wallet. Fashion also influences the design of headsets, which allow you to listen to music or make calls via the computer and even control it, without taking it out of your pocket.

The style of the mobile is something else. What is the ideal size? What physical controls should

it have? What kind of screen? Can it fold? Can it bend? Can it scroll in and out? What inputs and outputs?

My feeling is that it does not need an integral keyboard, although this may be a matter of taste. Careful use of handwriting recognition on the Origami interface is easier than texting using a mini-keyboard or number pad. It is good enough to answer emails on the move. Quicker still, you can email handwritten notes. For fast writing, you can always link in a separate keyboard.

This is true of other peripherals. A smart machine in a smart environment (see box, right) will be able to access drives, large screens and other devices via the network. It is already very easy to get a

Windows portable to act as a front end to an XP desktop.

A small tablet is also an ideal control interface for home networks. Home networks will never go mainstream without a foolproof interface that hides their complexity and a tablet can provide this.

Every hardware feature a mobile carries will have to be audited for

weight, size, cost and, above all, power drain.

But the trickiest and subtlest challenge of all will be the human interface and that will evolve as millions of us stab away at those screens. It will take time, but it is the one part of the design process that we will all be involved in.

Clive Akass

## The ultimate mobile

Origami has similarities to the 'ultimate mobile' or universal interface, I imagined five years ago in a *PCW* piece entitled *Smart machine* in a smart environment. This was just a set of ideas, but some of them are still relevant, and you can read it here: [http://images.vnUNET.com/v5\\_static/pcw/pdf/Universalinterface.pdf](http://images.vnUNET.com/v5_static/pcw/pdf/Universalinterface.pdf).

I'd be happy to hear how you imagine the ultimate mobile.

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# Solid-state laptop on horizon

The era of the solid-state notebook came a step closer with the announcement by Samsung of a 32GB flash drive that can take the place of a hard disk.

The 15g solid-state disk (SSD) uses Nand flash and is only a quarter the weight of a 1.8in hard drive, but reads data three times faster and writes 1.5 times faster while using a twentieth of the electrical power.

It also has the advantages of being silent, having no moving parts and it is more robust than a disk drive.



4GB going on 32GB... Panasonic's high-capacity SDHC card

Samsung would not release any prices after the announcement at the Mobile Solution event in Taiwan, but with flash costing around £17 per GB, the memory cost alone would be around £540.

The price of Nand flash is expected to fall by around half

over the next three years, though even this would still make it far more expensive per gigabyte than hard-disk storage.

SD (Secure Digital) cards are also heading for 32GB capacities, according to Panasonic. It showed a 4GB SD card at Cebit that will be on the market by summer. Only slots supporting a new version 2 SD spec will be able to use it, though these will also take older SD cards.

The new high-capacity SDHC cards will have transfer rates of up to 6Mbytes/sec.

# HD drives launch amid Blu-ray blues

The rival high-definition recording camps were neck and neck after showing off their products at Cebit.

Toshiba launched its HD-DVD player on 31 March to coincide with the release of the first movies in the format. Samsung said it would launch a Blu-ray player in late May, and Panasonic will ship one globally in the autumn.

Samsung then showed us a PC Blu-ray drive that appeared to trump them all, being the first to offer burning in either format. It is



'triple write', which means it will also burn CD and DVD discs, and could be launched as soon as mid-May at a wholesale price of around \$600 (£340 approx).

This is just \$100 more than the reported price of Toshiba's HD-DVD player – and that cannot burn discs.

Samsung's drive has two-speed burn capabilities and a transfer rate of 9Mbits/sec; but it had an IDE rather than a Sata (serial ATA) interface. A USB

Toshiba's HD-DVD is unable to burn discs



This Blu-ray drive from Samsung is 'triple write'

external drive will follow shortly. A triple-write four-speed drive, and a slimline two-speed model for laptops, are planned for early next year with a four-speed slimline one in the second half of 2007.

Blu-ray is, however, having teething problems. Ulead has withdrawn Blu-ray support from its DVD Movie Factory 5 software in order to allow the company to complete 'compliance testing'. HD-DVD support was retained.

Meanwhile LG cancelled the early launch of its Blu-ray player and announced that it would launch another later this year – supporting both technologies.

# Third format enters the high-definition fray

A third high-definition storage technology emerged at Cebit to complicate the format battle further.

New Medium Enterprises (NME) pushed the Versatile Multi-layer Disc (VMD) format that it claims stores up to 40GB per disc using the same low-cost red lasers used in standard DVD drives. It plans to sell a player for \$150, less than a third of the price of an HD player.

VMD uses multi-layer recording and there were 20GB, 30GB and 40GB discs on show. NME spokesman Alexander Bolgar-Hagerty said 100GB VMD recording had been achieved in the lab.

He said London-based NME is merging with E-World which owns EVS, a Chinese HD standard. NME owns a higher resolution (1,900 x 1,080) standard.

Bolgar-Hagerty said: 'Because our technology is multi-layer, it can be adapted to blue laser when it becomes more affordable.'

NME is not trying to compete with the Blu-ray and HD-DVD formats head on. Bolgar-Hagerty said: 'We have to start somewhere and we have signed up Bollywood and the Chinese [film] markets, the two largest markets in the world.'

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# Chic PC models and cool chips

The exterior design of PCs and notebooks has become more innovative with the convergence of computing and consumer electronics and the fact that the latest cool processors permit smaller, slimmer models.



Apple chic has also had an effect, though Macs have never had a monopoly on computing elegance. Pastel-coloured models from FIC were typical of one format being pushed at Cebit.

Similar models, the size of a large book, were on show from companies including ECS and Gigabyte. Shuttle showed a mini x100 design styled like a hifi unit.

Some of the new designs were clearly aimed at women, such as a pink Asus notebook with a matching case (pictured above). Ego computers showed the notebook pictured below.

There were few examples of machines using BTX form factor motherboards, designed for easy cooling, Gigabyte had two or three BTX motherboards, and showed a gaming machine built round one.

For more pictures and links go to [http://labs.pcw.co.uk/2006/03/pc\\_designs\\_get\\_.html](http://labs.pcw.co.uk/2006/03/pc_designs_get_.html).





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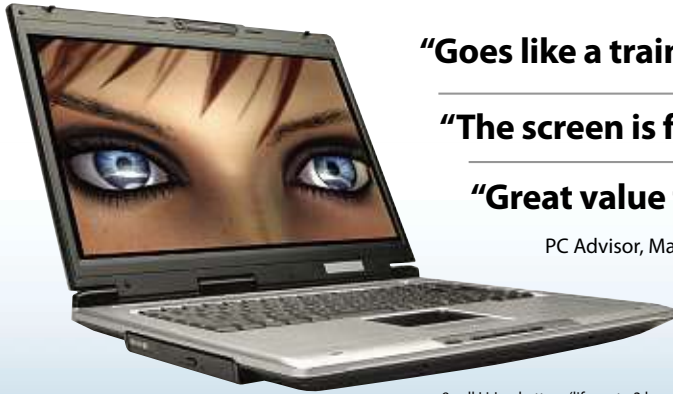


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- Intel Centrino Duo Mobile Technology: Intel Core Duo processor T2400 (1.83GHz, 2MB L2cache, 667MHz)
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- 256MB ATI Mobility Radeon X1600 graphics
- 15.4" WXGA X-Bright wide screen display (1280x800)
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Radeon X1600  
Graphics



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## Multi award winner



## Voyager C720

e-CODE: VY1504

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- 256MB NVIDIA GeForce Go 7800 GTX graphics
- 17" WXGA X-Bright wide screen display (1440x900)
- 1GB DDR2 RAM 533MHz (2x512MB)
- 80GB S-ATA 5400rpm hard drive
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- Wireless Mini PCI 802.11abg (54Mbps) LAN
- Virtual 8 channel audio and speakers
- Built-in media card reader (MS/Pro, SD, MMC)



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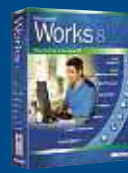
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## PC that picks your brains



Researchers are exploring ways to use EEG techniques, which measure electrical activity from different points on the skull, to allow the brain to 'talk' to a computer.

You can generate a particular EEG signal by thinking about, say, moving a leg, without moving it; so this can be used to send a signal to a computer.

Research teams have been working on this Brain-Computer Interface for some time, mainly with the aim of enabling disabled people to communicate. But users need weeks of training under current systems in order to be able to generate signals the computer can recognise.

The system, demonstrated at Cebit, uses a new approach from Germany's Fraunhofer Institute and Berlin's Charite university hospital. This puts the onus on the computer to learn to extract, from the many signals generated in the brain each second, the ones associated with particular activities.

Researchers believe this could be used to move a cursor on a screen, allowing a paralysed person to 'write' by picking out letters; it could also be used to control an artificial limb.

## PC tops 5GHz

Asetek, Kingston Technology and Western Digital joined forces to create what was claimed at Cebit to be the world's fastest PC. The Dream Machine overclocked Intel's P4 3.8GHz processor to 5.46GHz, which was cooled by Asetek's Vapochill Lightspeed unit.

The graphics card and chipset were cooled by Asetek's Waterchill system. Kingston supplied the HyperX KHX7200D2K2 DDR2 Ram and the unit used Western Digital's Raptor X 150GB hard drive.

# Airing for mobile Wimax

**A**irspan showed a prototype USB dongle supporting mobile Wimax, in a bid to persuade operators to invest what is being billed as 'broadband on the move'.

The company designed the 16eUSB device for a Japanese company called Yozan, which plans to set up a mobile Wimax infrastructure. It conforms to the IEEE 802.16e specification, which was approved in February.

Airspan is currently involved in a Wimax trial with UK service provider Pipex, which owns spectrum in the 3.3-3.7GHz band. But that is for fixed Wimax, which was conceived as a way of filling in gaps in land-based web access. Mobile Wimax is seen as a potential rival to 3G cellular links.

Paul Senior, vice-president of Airspan's product management,



16eUSB dongle for mobile Wimax

admitted mobile Wimax would need considerable investment in base stations and dismissed suggestions, expressed by more than one vendor at Cebit, that it has little to offer that cannot be done with 3G.

Each base station would have, as a conservative estimate, 100Mbps/sec to share out, which was three times as much as 'evolved' forms of 3G such as HSPDA. It had all the latest

technology including MIMO, which uses multiple aerials to allow multiple data streams to share the same carrier frequencies.

Individual users could expect to get rates of 9Mbps/sec downstream and 2Mbps/sec upstream, with low latency for gaming and quality of service provision for tasks such as web calls.

'Wimax is an IP-centric wide area communication technology. 3G is voice centric... IP has been grafted onto it over seven to 10 years bit by bit and it is not looking too healthy. You get half-a-dozen users using Skype and you start to get huge issues,' said Senior.

The Airspan dongle is quad-band, covering all the frequencies likely to be used by Wimax across the world. Intel plans to embed Wimax in future motherboards.

## 11n links 'will hog Wifi airspace'

Top data rates in next-generation 802.11n Wifi links will be achievable only by hogging bandwidth in channels already congested with 11b and 11g links, industry experts warn.

Existing flavours of Wifi use 20MHz channels and you can double the data rate by doubling this bandwidth. Proprietary turbo modes on some 11g devices do this by 'bonding' two channels, which is like using two lines instead of one on a crowded switchboard. Controversy over this led some vendors to switch off turbo mode by default or to have

it switch off when it detects other Wifi networks.

Yet a late amendment to the 11n draft spec allows for optional 40MHz channels, the equivalent of two existing ones. Masato Kato, Buffalo engineering manager and observer at the 11n deliberations, pointed out this will leave only one non-overlapping channel at 2.4GHz where it is common to find several networks competing for airspace.

Channel bonding is illegal in Japan. But 11n would be faster than existing Wifi even without channel bonding, partly due to

MIMO (see above). Vendors have talked of raw data rates of up to 600Mbps/sec, but Kato said real throughput could be 70-150Mbps/sec with the higher rate depending on channel bonding.

Paul Senior, vice-president of Airspan product management, said no-one will know until certified 11n products appear. 11n can use the less congested 5GHz bands as well as 2.4GHz and their speed is not the only advantage of the new spec. It will give Wifi a robust security model and has provisions that will improve the standard of VoIP calls.

## Panasonic launches SLR

Panasonic showed off a single-lens-reflex (SLR) digital camera designed to operate as much as possible like a traditional SLR. The 7.5megapixel Lumix DMV-L1 has manual shutter and aperture controls and a new Leica-made D Vario-Elmarit 14-50mm zoom. Also launched was the 6megapixel Lumix DMC-FX01, said to be the smallest camera with the equivalent of a 35mm model's 28mm lens – few compact digicams are good at wide angles. The Leica DC lens also incorporates a 3.6x optical zoom.



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# 100Mbit links in pipeline

**B**luetooth links with transfer rates in excess of 100Mbits/sec could be available within two years, following the resolution of a spat over which wireless technology to use.

The governing Bluetooth Special Interest Group (SIG) as selected the Intel-backed Wimedia Alliance flavour of Ultra-Wideband (UWB), rejecting a rival spec from the Motorola-backed UWB Forum.

UWB can be thought of as a virtual wire with a theoretical throughput of up to 480Mbits/sec, over which any number of communications protocols may be used. UWB-based wireless USB is about to be seen in products (see below) and a 1394 (Firewire) version is in the pipeline.

Extended-data-rate Bluetooth, the fastest available today, offers only 3Mbits/sec.

Mike Foley, executive director of the Bluetooth SIG, said there will be some overlap between wireless USB and high-speed Bluetooth but they would be largely complementary. 'They are

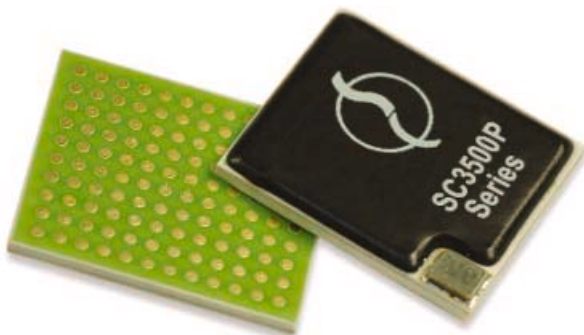
used in different scenarios and I think that will continue. I see Bluetooth as being very strong in peer-to-peer ad-hoc type of situations, whereas USB is strong in the host-to-peripheral model.'

Foley said it was hoped to get to get high-speed power requirements down to those of today's Bluetooth devices. UWB was very good at bursting a lot of data in a very short time and Bluetooth was very good at minimising power use in sleep and standby modes. 'I think we can combine the two to get the best of both worlds.'

Throughput will be about 100Mbits/sec across a room, but could be faster over shorter distances. The spec is expected to be finalised around autumn next year, with products appearing three to six months later.

Stephen Wood, president of the Wimedia Alliance, said it hoped to pitch first-generation products at a cost of around \$10-\$15 (£5.76-£8.64 approx) per device, but this could drop to below \$3 (£1.73) in time. *Clive Akass*

## Wireless USB coming this year



Chips such as this could enable the links to be embedded in mobile phones

Cameras using Certified Wireless USB links rated at 480Mbits/sec could be on sale as soon as this Christmas, according to vendors at the Intel Developer Forum. A disk drive with the link, which used UWB wireless (see story above), was on also on show.

The links could also be embedded in PCs and, eventually, mobile phones using chips such as the one pictured above from

Staccato. USB2 dongles will be available to bring the technology to existing PCs to allow them to swap files quickly with peripherals.

UWB, whether using Bluetooth or USB protocols, is designed for short-range device-to-device links; one aim is to use it to replace the mass of wires needed to link up home-entertainment systems. *Rob Jones*

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**The Voice Interpreter** that recognises your voice as well as your accent. You dictate; it writes and instructs your computer...

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**The Document Administrator** that provides reliable back up. You produce; it organises, classifies and searches for your (e-) documents...

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## Intel pushes mobile access

Intel is trying to push the 'Martini model' of mobile computing, promoting access any time, any place, anywhere. The company said at IDF that it was working on pushing reliable computing on the move by improving the devices, networks and standards.

Intel is looking at energy-efficient platforms, radio functionality built in the same Cmos technology used to create processors, antennas, low-power radio links and Mimo technology as used in the emerging 11n standard (see page 20).

Challenges include getting more technology into smaller devices, and improving networks to handle the changing way they are used, particularly the demands on mobile networks from handheld devices.

Intel is showing off some of the work done as part of a five-year Seamless Access Initiative to allow any device to access different types of network in a standard way. It has been working on the project with partners, using traditional wireless IP methods and 3G Sim cards for authentication. It will encompass Wimax networks (see page 20) in the future.

The Cmos radio project stems from an effort to minimise the number of distinct pieces of silicon in a system. It will use less power and space, and will handle different radio standards more effectively.

Intel researchers have built Cmos Mimo transceivers on 90nm silicon wafers that double the 802.11g Wifi data rate to 100Mbps/sec. The radio is still at an early stage of development, and Intel is having to address problems such as eliminating crosstalk: interference between signals on the closely spaced links within the chip.

'Even small amounts of crosstalk between the radio chain on the same chip will get you in trouble, because you get bleed-through. Anything that causes crosstalk reduces the effectiveness of the technology,' said Kevin Kahn, director of the Communications Technology lab.

'When you put multiple radios on a single chip it's very difficult to solve problems like crosstalk'.

# 32nm chips expected in 2009

Intel, which is currently moving from 90nm to 65nm production, will move to 32nm processors in 2009. It is also investigating the use of carbon nanotubes to replace silicon transistors to maintain the pace of miniaturisation.

All Intel's new chips (Conroe, Merom and Woodcrest – see page 23) will be built on a 65nm process from later this year. The figure refers to the size of the smallest feature that can be defined on a chip and therefore how densely its transistors can be packed.

Early next year the company will introduce 45nm processors,

and will double the number of cores to four. The number will double again each time feature size is reduced, said Intel. The company hopes to offer 22nm in 2011 and 11nm in 2013.

Intel has transistors in its laboratories at those scales, but faces the problem of how to manufacture them, a spokesman said. The new 45nm CPUs double the transistor density, putting over one billion of them on a single die. But as the feature size is reduced, there comes a point where electrons can no longer be efficiently moved around.

So Intel is investigating a range of alternative technologies, including tri-gate and 3D transistors, and carbon nanotubes. These are single molecules of high conductivity and have been around since 1991 but were not fully investigated for 10 years. Intel believes they could solve the problem of producing nanoscale conductive materials.

Paolo Gargini, who heads up silicon research at Intel, said the technology was on track for release between 2012 and 2015. By that time, in theory, Intel could be producing processors with 64 cores on a single die.

## Confused memory holds up terascale IT

IDF began with a pre-briefing that put meat onto the bone of a concept Intel kicked off a couple of years ago – the era of Tera.

As computers need increasing performance, the people using them want to interact with them in a more natural way and the processor giant is putting money and time behind the Tera Scale Computing Research program.

Now a set of over 80 projects, it aims to develop technology allowing future software to have far higher performance capabilities, taking advantage of tens or hundreds of cores within a CPU.

Justin Rattner, chief technology officer at Intel, explained: 'What's motivating the transition is that multi-core is an effective way of

getting more performance using less energy. We see multi-core as giving us the ability to get back on the traditional performance growth line we had begun to shift away from.'

The main challenges will be to develop memory bandwidth and learn how to program software that can dedicate individual processes to individual cores within the die. This means Intel – and programmers in the future – must understand how to design software to take advantage of so many threads.

The projects are split into three main areas – silicon, platform and software – with a number of sub-projects within each group.

One of the biggest problems that Intel is attempting to crack is finding a way to avoid data being

corrupted when multiple threads share memory. Today this is done by locking memory for use by a single thread, forcing other threads to wait for access and reducing the benefit of processing them more or less in parallel across multiple cores.

A Java-based project using a technology called transactional memory shows promise, Rattner said. It allows hardware and software to discover when there is a conflict, simplifies programs and removes many problems associated with locking memory. It also means programs and processes run faster as multiple cores are better used.

Rattner said: 'We have to solve this problem if we are going to exploit the potential of high core count processors.'

## Intel shows Origami concept

One aim of power-efficient computing is to create a truly portable PC or ultra-mobile, the concept that made Cebit – which happened at much the same time as IDF – so interesting (see pages 14 and 16).

IDF attendees looked at a selection of prototypes running Microsoft's Origami software. They ranged in weight from 450g to 650g, slightly lighter than most of the production models shown at Cebit. Details of the specifications were scarce but there was speculation that they were using clocked-down chips to keep with the 5w power limit.

One of the Intel models, just visible in the picture (right), had a swivel keyboard. You can see more pictures at [www.pcw.co.uk/2151521](http://www.pcw.co.uk/2151521).



Intel's model had a swivel keyboard

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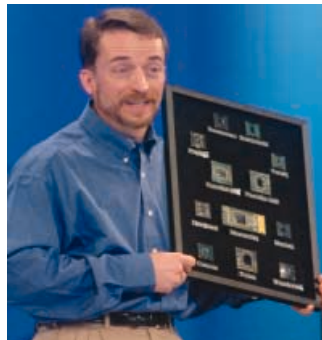
# Frugal dual-cores out soon

Three dual-core processor ranges will be launched this year using Intel's new power-efficient core microarchitecture (see page 14) amid the usual confusion of codenames.

Coming this autumn will be a new desktop processor, codenamed Crusoe, which is said to have 40 per cent better performance than today's fastest mainstream product, the Pentium D 950, while using 40 per cent less power. Due at much the same time is Woodcrest, for servers and high-end workstations.

A third, Merom, will launch this year as part of a 'refresh' of the Napa platform, the second-generation Centrino notebook architecture designed around Core Duo processors.

Intel said Merom will have three times the performance per watt of the original Pentium M notebook chip and will have more processing



Intel senior vice-president Pat Gelsinger holds 12 of Intel's new dual-core chips at IDF

power than current Core Duos. It will draw much the same electrical power, allowing notebook builders to use it in existing Napa products without modifying their thermal design. Napas have been on the market for only a few months.

A third-generation of this platform dynasty, codenamed Santa

Rosa, will be launched next year, probably under the Centrino umbrella brand (although Intel has not yet said so). This will use the Merom processor and a chipset comprising Crestline, offering improved integrated graphics and security and the ICH8-M communications hub supporting 10 USB2 and three SATA ports.

A module called Kedron will extend the current Wifi support from 802.11abg to the emerging 11n standard. This is not due to be ratified until next year and so may dictate the Santa Rosa launch date.

The new platform will also use a technology called Robson, using fast Nand flash memory (initially just 256MB to keep down cost) and clever caching to speed bootups and application loading. This should give laptops instant-on and -off capabilities making them suitable as home-entertainment systems.

# Viiv goes with media flow

Many of the mobile Centrino innovations will migrate to Intel's Viiv platform for entertainment PCs, to help cut down on noise and heat.

Viiv version 1.5 will be launched later this year and will include digital-rights management to allow protected content to be pumped around homes.

Don Macdonald, who is in charge of Viiv, said Intel had built several improvements into Microsoft's Windows Media Center software, including better power management, making it easier to access content on a hard disk without the host PC switched on.

Intel argues that Viiv PCs are now quieter and cooler than many other living-room devices.

Macdonald showed a chart of Viiv's heat and noise compared with other common devices. You can see it by following the links at [www.pcw.co.uk/2151585](http://www.pcw.co.uk/2151585).

# DrayTek Broadband Firewall/Routers



Vigor3300V

Make free Internet Voice Calls!

VigorTalk for DrayTEL  
[www.draytel.org](http://www.draytel.org)



Vigor2900

DrayTek routers and firewalls provide a vast array of essential and advanced features, designed around users needs. The new Vigor2800 series provides compatibility with the latest ADSL2+ lines, as well as enhanced security, content filtering, VPN, 108Mb/s wireless and Voice-over-IP. Also available is the Vigor2900 series for cable modem users and the new Vigor3100 router/firewall for SDSL.

The new Vigor3300V is a high performance firewall, VPN concentrator and VoIP (Voice-over-IP) device. Stateful Firewall, load balancing, content filtering, up to 200 VPN tunnels and up to 8 VoIP ports. (Due March).



Vigor3100 SDSL



Vigor2800 Series

DrayTek VoIP-equipped routers let you use your broadband line to make and receive voice calls. Calls to any other VoIP-equipped users are completely free and you can make calls to regular phones via DrayTEL with national & international calls from just 1p/min.



Available from  
**SEG**  
020 8381 5500  
VoIP : 800800@draytel.org

For full details of all models visit  
[www.draytek.co.uk](http://www.draytek.co.uk)

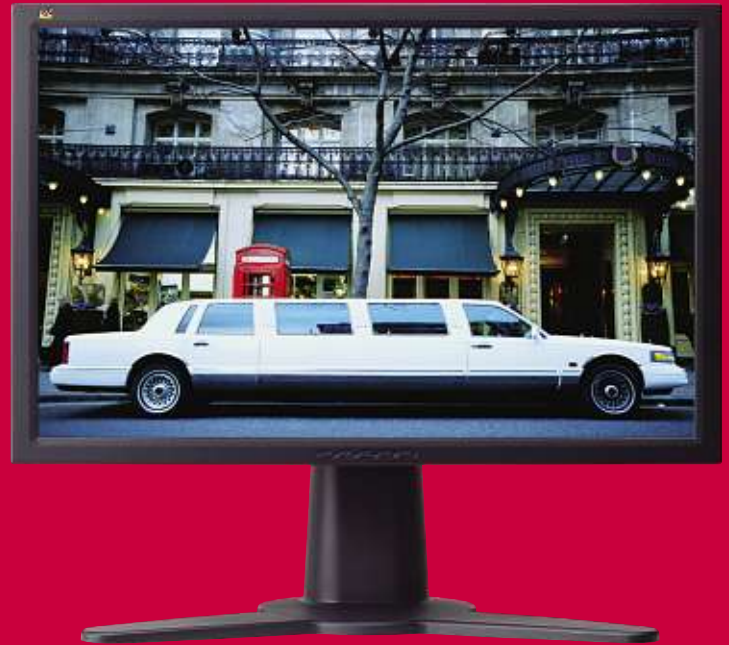
Specification subject to change. Facilities vary with model.

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**PROBLEMS WITH SPACE?**

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March 06



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**VA1912w (19"):**

Resolution 1440 x 900, contrast ratio 500:1, response time 8ms, brightness 300 cd/m<sup>2</sup>, viewing angles 150°/130° h/v



**VA2012w (20"):**

1680 x 1050, 600:1, 8ms, 300 cd/m<sup>2</sup>, 140°/125° h/v



**VX2025wm (20"):**

1680 x 1050, 800:1, 8ms (gtg), 300 cd/m<sup>2</sup>, 140°/125° h/v



**VP231wb (23"):**

1920 x 1200, 500:1, 12ms (gtg), 250 cd/m<sup>2</sup>, 176°/176° h/v

Expand your view with ViewSonic's widescreen displays. The 16:10 aspect ratio provides more productive space for multiple windows, high definition images and immersive gaming action. These feature-rich displays ensure crystal-clear images and crisp text. Upgrade your workspace while staying within your budget – choose a widescreen display from ViewSonic.

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# Last call for mains adapters?

**M**ultiple power adapters could soon be a thing of the past thanks to an upgrade of technology that powers a device over the same Ethernet cable that delivers data.

The IEEE 802.3af Power-over-Ethernet (PoE) standard currently allows for the delivery of just 13w, enough to drive small low-drain devices such as webcams. It was approved only three years ago, yet already one in six new Ethernet ports are powered.

Now an IEEE taskforce plans an 802.3at standard that will deliver up to 45w. 'That's enough for a laptop or a motherboard plus memory,' said Igal Rotem, CEO of PoE pioneer Powersdine.

The standard, expected to be ratified late next year, will be the nearest thing yet to a universal DC



**Powersdine offers 802.3af-compatible systems delivering up to 35w**

power supply. It falls short of the ideal, a plug-and-play system that simply delivers what a device says it wants – an idea, easily possible with existing technology, that has never gained industry momentum.

Rotem said the 45w standard will have the same effect. 'I believe that soon you will go to any hotel, any airport in the world and power will be delivered over Ethernet. You will need one cable and a plug – the RJ-45 [Ethernet] jack.'

Rotem said the RJ-45 is used on networked devices in every country, unlike mains and device power plugs. He thinks laptops could be PoE-enabled for as little as a dollar a unit. Powersdine sells both midspan units (left) – which PoE-enable an existing switch – and chips that manufacturers use to embed PoE into switches. PoE sockets can be safely used by non-PoE devices.

The company plans to offer 'pre-802.3at' 45w systems in 2007. Rotem said, as far as possible, they would be made upgradeable to the standard when it is approved.

## Organic transistors reach silicon speed

A polymer that matches the electrical performance of amorphous silicon could lead to a cheap way to make electronic paper.

Amorphous (non-crystalline) silicon is sluggish compared with the more structured form used in processors. But it is relatively easily to deposit over large areas and is commonly used to create the matrix of thin-film transistors (TFT) that drive most LCDs.

Companies such as Britain's Plastic Logic have been developing organic (that is, carbon-based)

semiconductors that promise less-expensive ways to do the same job. They can be made into inks so transistors and entire circuits can be printed out by inkjet or gravure even press.

The new polymer, reported in the April edition of *Nature Materials*, is said to have six times the performance of any similar material previously reported. It was developed at the Merck labs at Southampton and at Stanford and other California establishments. Iain McCulloch, project manager at

Merck, said the main aim was to reduce manufacturing costs.

The polymer is compatible with plastic substrates that could 'enable a new generation of flexible, lightweight and ultimately large area displays'. It is likely to be used first in disposable novelty items, followed by small reflective PDA displays or epaper, and posters.

'Further away are large, high-resolution displays such as active-matrix LCD or OLED (organic light emitting diode),' McCulloch said.

## Data link hits 2.5Tbits/sec

Researchers have transferred data at 2.56terabits/sec over a 160km glass-fibre link – more than twice as fast as the world record of 1.2Tbits/sec and the equivalent of sending the contents of 60 DVDs in one second.

The new world record was set by researchers at the Fraunhofer Institute for Telecommunications in Berlin in co-operation with Fujitsu Laboratories.

They point out that network traffic is increasing by more than 50 per cent a year, which will force the industry to make more efficient use of better optical fibre links.

A Fraunhofer statement said: 'In today's systems only a fraction of the almost inexhaustible bandwidth of optical fibre is exploited.'

## PC dongle for wireless Skype

UK-based Bluetooth pioneer CSR has developed a Bluetooth dongle kit for making Voice over IP (VoIP) calls wirelessly via your PC. The CSR Voice Dongle 1 kit is designed for manufacturers to build products around. It comprises all the components needed for a low-cost plug-and-play USB dongle that will let you make free Skype calls via a Bluetooth mono headset.

It will automatically locate your Bluetooth headset and allow you to accept or reject calls, adjust the volume and mute calls. Headset specialist Plantronics plans to launch a dongle based on the chip soon.

## HD streamer

D-Link is offering a home media streaming device that supports high-definition video. The £221 DSM-520 Media Lounge also streams music and photos, which it can access on a USB drive as well as your PC's hard disk.

It can use a wired or 11g wireless link and has an HDMI (High-Definition Multimedia Interface) interface, as well as S-video and composite-out connections.

## Smart optical fibre follows its own logic

Researchers have found a way to create smart optical fibre capable of performing tasks currently done by external electronics.

They created a transistor in a fibre just five-millionths of a metre in diameter by injecting vapourised germanium at very high pressure to create a layer of crystallised semiconductor. The work done at Southampton University's

Optoelectronics Research Centre in Britain, and Penn State University in the US, is essentially a proof of concept which should lead to more complex devices.

Pier Sazio, a research fellow at Southampton and lead author of a report on the work in *Science*, said the technique could be used to create modulators, which translate an electronic signal into

an optical one or switches. 'The leap forward is to engineer rich optoelectronic functionality inside an optical fibre,' he said.

A basic building block of fibre links and the web, the erbium-doped fibre amplifier, was invented at Southampton in 1986; it allows optical signals to be amplified without the need for a slower electronic process.

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# LETTERS

→ Send your letters to The Editor, PCW, VNU Business Publications, 32-34 Broadwick Street, London. W1A 2HG.

Send your email to [letters@pcw.co.uk](mailto:letters@pcw.co.uk)

★ LETTER OF THE MONTH

## DIY PCs are best

In a recent group test (£699 PCs, April 2006) you covered the pros and cons of assembling your own PC versus buying a prebuilt model. However, I feel that certain points were missed.

I don't dispute that it's easier to buy a prebuilt machine. The machine comes preloaded with the software and warranties are all in place. For a novice or casual user this is the sensible choice.

However, for the more experienced, buying a PC does not represent the cost-effective option that nearly everybody assumes. It is always presented in the media that assembling your own PC nearly always costs the same, if not more than a prebuilt option. Then on top of this, attention is drawn to the fact that your custom system doesn't have warranties and support.

I find this to be missing the point. A self-built PC will still have some form of warranty on each separate component, usually for 12 months or more – for example, my hard disk has a five-year warranty.

With regard to cost, building your own high-spec PC is not what I would consider to be 'expensive'. Once you have built your first PC, you use it as a base and perform major upgrades later

on. For instance, my next major upgrade will only require me to purchase a motherboard, Ram, CPU and possibly a new graphics card. All other components will be utilised from my current system. So obviously it will cost less than a prebuilt PC. Add to this the enjoyment I've had in building and setting it up, plus its specification meets my requirements exactly.

People will always buy from mass manufacturers, but the fact that building your own PC is always seen as the more expensive option, and less reliable, infuriates me. We all read PC magazines because we want to learn more about the technology, or simply because we're passionate about it. It's precisely us, and yourselves, who should be passing on the positive message that building a PC is a sensible option, that in many instances it's cheaper and it's far more enjoyable!  
Carl Barker

Kelvyn Taylor replies: We do agree with most of your points and, to be fair, we did mention component warranties and the satisfaction you can get from building your own PC. But it's certainly not the cheap route to owning a PC that it used to be.

## POSTCODES FOR TOM TOM

Many thanks for the recent round-up of sat nav devices in your May 2006 issue. It confirmed that my recent decision to buy a Tom Tom One was the right one.

However, on page 79 you state in the table that the Tom Tom One only has partial support for UK postcodes. As a proud owner I feel I should point out that this is not the case. Full seven-digit postcode support is available by selecting the Postcode icon rather than the Address in the navigation screen. Only a minor error in an otherwise excellent article. Keep up the good work.  
Chris Lee

*Kelvyn Taylor replies: You're right, and we apologise for the oversight. But Tom Tom doesn't make it obvious that this is the case and there's a specific FAQ on its support site about*

**The Tom Tom One supports full seven-digit UK postcodes**

*this. Why the full seven-digit search isn't made available in the address search remains a mystery.*

## MEMORIES OF COMPUTERTOWN UK

I was interested to read John Bone's letter re Computertown UK (CTUK) in the April 2006 issue. Yes, John, there are still some of us about. I helped create CTUK Thanet in the early 1980s together with my colleague Jon Finegold. We had great fun putting computers in local libraries so that the general public could get some hands-on experience. That was in the days when libraries didn't know what



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computers were, either, but they were enthusiastic and keen to see what could be done.

I remember having long telephone conversations with David Tebbutt which were sometimes interrupted by the demands of his small children. I wrote a piece about our Computertown Thanet activities for PCW and later helped organise and run a CTUK stand at the PCW Show in the Barbican Centre, London.

Now, aged 70, I am still an enthusiastic PC user as well as a PCW reader. Much has changed but the wonder of it all continues to stimulate and delight.

**Peter Kiff**

### TABLETS MISS POINT

The tablet PC group test in April's PCW was interesting, but the machines seemed to miss the point in such a major way that I'm not surprised the tablet concept hasn't taken off.

Surely the key thing about a tablet is that it is light and convenient to move about? To use it standing up, to have it in a meeting without looking like an idiot? When sitting at a desk the motivation becomes minimal. Doesn't this point to a detachable keyboard, and the CD/DVD drive in a docking station?

Basically what would be nice would be something superficially like a laptop, where the screen part detaches and is usable as a tablet, and the other half holds the keyboard, optical drive and so on. OK, I can see there are balance issues, but I can also see ways round them.

Is this what Microsoft's Origami will be? Seems not.

**Tom Richards**

### BEWARE LIMITATIONS OF FLASH MEMORY

I enjoyed your article in the April 2006 issue about putting software onto USB memory sticks. With the size of Flash memory increasing all the time, they have many uses. However, it might have been best if you included a warning about the life of this type of memory.



Much of the Flash Ram is guaranteed to provide 100,000 read/write operations, after which it will malfunction or not work at all. This may seem like a very large number, but it would be very easy for a computer booting up into Windows to write to a specific address on the Flash Ram hundreds of times.

In as little as a year, the memory could begin to malfunction if a computer is repeatedly booted up using one. There are ways around this: temporary files could be written to the hard disk and not the Flash Ram; the swap file located on the hard disk; the software written so that components needed during operation are transferred only once, rather than being loaded/unloaded repeatedly.

When software and the Windows operating system are written in this way, then we will be able to use these USB memory sticks as a reliable means of keeping all our personal data/programs safe and transportable. Until then, it may be best just to use them for emergencies or for just having a bit of fun.

Thanks for listening. Keep up the good work with your magazine.

**Tim Howarth**

*Kelvyn Taylor replies: It's true that individual Flash memory cells have a limited lifespan, and we wouldn't recommend using a Flash drive to run an operating system from for extended periods.*

### BACKING A RACEHORSE

Having struggled to run a small Internet business on an aged Dell Pentium 200 machine, I finally

**A detachable keyboard might make tablet PCs more convenient to use, and more popular**

upgraded to what the PC World salesman called 'a racehorse of a laptop, sir'.

And initially it was. I installed new software and ran all my business phone calls through Skype. Then a cooling fan started rattling like a faulty Zimmer frame and the 'N' key stopped working.

For two weeks my laptop disappeared into the parallel universe of the HP repair shop. I eked a living on the old Dell. I lost all my business phone calls and could not use my whizzy new software.

The moral of the story? If you upgrade from a very old machine, make sure you have a suitable backup, and an analogue phone line, if you want to eat.

**Richard Barker**

### BT BLACK HOLE

I reside in a rural black hole of Surrey just 40 miles from Central London. Not only can I not receive any mobile signal; even from Orange which has a mast a mile away (behind trees), but we have also been deprived of broadband and had the distinction of being the last exchange in Surrey to be not connected. During the past three-year period, BT insisted it had 'no plans' to provide broadband as the number of subscribers was uneconomic.

Campaigns by rural businesses eventually enabled the supply of broadband to be put to tender. Brilliant! However, BT won the tender.

Following a successful breakfast meeting, with free croissants and coffee, the backwoodsmen and women were advised that the necessary black box would be installed in the local exchange in one week's time, and we should check with BT that the overhead copper wire supplying us was adequate to give

satisfactory bandwidth, then we could have the line tested and request connection. Following the meeting, a casual check on the BT website still indicated that BT had no broadband plans for our exchange.


A lengthy telephone 150 enquiry (over one hour) involving multitudinous menus, salespeople, broadband specialists and anyone who the person answering the enquiry could pass me on to, led to the answer that BT had no knowledge of the impending enablement, it did not know that a tender had been held or that it had won it and all its current information indicated that there were still no plans to install it on our beleaguered exchange.

I await 'D' day in three days' time with great interest and wonder whether BT should really have a monopoly on all our copper wire. I am still debating whether to use it as an ISP!

**David (surname withheld by request)**

WIN

Next month's prize for the letter of the month is a Pinnacle Soundbridge



This sleek network music player is a true plug-and-play solution for enjoying all your digital music throughout the house via your existing Wifi router. It lets you control your music library from across the room using the remote control and plays a large selection of Internet radio stations, even when your computer isn't on. It requires no software installations, and supports audio formats including wma, aac and mp3, as well as a multitude of music services such as iTunes and WMP10. For more information on the Pinnacle Soundbridge, go to [www.pinnaclesys.com](http://www.pinnaclesys.com).

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# THE ADVISER

## PCW GIVES ADVICE ON YOUR RIGHTS

➔ Send details of your dispute to [theadviser@pcw.co.uk](mailto:theadviser@pcw.co.uk). Please provide a daytime telephone number so we can contact you if necessary.

### COVER YOURSELF

- Keep good records; store all receipts in one safe place as proof of purchase is vital.
- Create a folder in your email client to store emailed receipts – and print a copy. Print spec sheets from websites as proof of an order.
- Get written quotes specifying components used.
- Use a credit card for purchases of £100 or more – credit card companies are liable if the vendor goes out of business.
- Do not try to repair faults – this invalidates your rights in the majority of cases.
- Think before buying expensive hardware outside the EU, because if something goes wrong, enforcing your rights is difficult. Shipping faulty kit back will be costly.
- Never cancel a direct debit or standing order as a means to resolve a dispute over payments or service. You may get a poor credit rating and face court action.

### HOW TO COMPLAIN

- Keep records of who you speak to, along with any paperwork and emails.
- Stay calm – companies will respond defensively to abuse and shouting, regardless of whether you are in the right.
- If the dispute reaches an impasse, insist on escalating the complaint. Get a director's name and send correspondence by recorded delivery.



### EVERYBODY NEEDS GOOD NEIGHBOURS

**I am seeking a refund for a motherboard from [www.limeleaf.co.uk](http://www.limeleaf.co.uk). When the company's courier attempted to deliver the item I was out, so the courier knocked on the door of a neighbour two doors away. My neighbour, who I hardly know, signed for the package and said they would deliver it to me when I returned. But the package was instead left on my doorstep and subsequently stolen. Limeleaf said it would consider refunding me as a 'goodwill gesture', but ultimately decided not to, saying that the company was not at fault.**

Andrew Evans

We called Limeleaf's parent company, Figarro, which explained that goods are dispatched direct from the motherboard manufacturer. The manufacturer selects the courier, Amtrak in this case, so Figarro has no control over courier terms. When Figarro made enquiries, Amtrak said it had fulfilled its responsibilities by obtaining a signature in good faith. In our view, the

neighbour is liable, but small claims cases do little for over-the-fence harmony.

Amtrak told us that this is a growing problem as more goods are ordered by phone or online, and that it offers retailers an 'unattended delivery' option which obliges it only to leave goods in a safe location. Retailers can then offer this as an option to customers who are likely to be out during the day, although some include it their own terms and conditions of sale.

Amtrak handles deliveries for lots of PC manufacturers, and it now offers a premium service so that goods can be delivered early in the morning or up to 8.30pm. But the company told us that few retailers offer this option to customers. There is an extra charge for out-of-work-hours deliveries, which Amtrak said would be about £10 to the retailer and call centre staff rarely offered the option.

With the number – and value – of home deliveries growing, we advise readers to be proactive about deliveries. Ask if there are other options and above all, get to know your neighbours. Final thanks to Figarro, which, despite having no liability in our view, has agreed to refund Mr Evans' money.

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Some couriers now offer evening delivery slots

### DABS.COM UPDATE

In the May issue of *PCW*, the Adviser team reported on Elwyn Watkins' dispute with Dabs.com, after the company asked him to send back a router that it subsequently agreed was faulty when sold. The cost of the item was refunded, but not the postage. In this situation, as we understand it, the Sale of Goods Act (SGA) decrees that the retailer should pay for the carriage to return the item. This payment is given as a refund, because the retailer has the right to inspect the goods first and make a judgement about whether they were inherently faulty.

This is a thorny issue for consumers, for while sending back a faulty memory card is relatively cheap, dispatching something bulky such as a disk drive or printer involves a significant outlay. Throw in the cost of insuring the delivery, which gives a safeguard in the event of a courier taking less than good care of or losing your disputed item, and the price rockets.

Last month we said that Dabs was still looking into the detail; it has now replied and said that it would not offer a refund of the postage because Mr Watkins had



Dabs has decided not to refund postage for a returned faulty product

failed to notify it of the fault with the 28-day 'faulty on arrival' period denoted in its terms and conditions. Mr Watkins told us he had ordered the router in November, but not set it up until Christmas as it was a present for someone.

There is no clear guidance here; an amendment to the SGA in 2002 gave consumers a period of six months from purchase in which they could return goods they believed were inherently faulty, with the onus being on retailers to prove otherwise. If a retailer accepts responsibility, then it must pay for carriage. However, consumers have responsibilities under the law too, and one obligation is to check that delivered goods are satisfactory within a reasonable time. This period is not set, although barring accident and illness, which could extend the definition of 'reasonable', most retailers accept goods within either a week or 28 days. We advise you to check this in terms and conditions before buying, especially from online stores.

Ultimately, cases such as this where the retailer has made a decision based on terms and conditions could only be ruled upon by the small claims court. Given that Mr Watkins has stated that he did not examine the goods for quality on arrival, legal action would be perilous and the sum involved is unlikely to make it worth the effort.

But don't let retailers land you with the bill for delivery when they supply faulty goods. The SGA clearly states that consumers should not be 'inconvenienced' or subjected to extra fees to repair broken items. Don't let deliveries sit unopened and untested for too long.

## CONTACT THE ADVISER

If you're involved in a serious dispute with a seller, send us a brief description of your complaint, name the company involved and provide an order number or other information that we can use to identify your order with the company. We cannot guarantee to resolve your dispute but we will try. We obviously cannot take on every case, but the answers we give should help readers to resolve their own disputes.

You can also get advice from Consumer Direct, a DTI-backed agency, at [www.consumerdirect.gov.uk](http://www.consumerdirect.gov.uk).

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## The path to a refund

**I have been a long-time user and admirer of Tom Tom's satellite navigation tools on my handheld PC. Problems arose, however, when I purchased version five, as the software took almost two months to arrive. When installed, I had to call the support team three times with separate issues.**

**The diagnosis wasn't particularly helpful, as the engineers said that a number of significant changes had been made and that the company could not guarantee that it would now**

**work on all the devices previously supported. A refund was agreed immediately, but no money arrived. When I contacted Tom Tom, I was told that the refund had been applied, so not only is the company holding my funds but it is also claiming I am wrong.**

Leanne Owen-Keenan

We're happy to say that this situation was resolved quickly and it soon became clear that there was some misunderstanding on both sides. Tom Tom had indeed made the refund immediately,

a little too quickly in fact, as Ms Owen-Keenan asked for the refund to be issued to a different debit card than that used to make the purchase. It was too late, and the misunderstanding arose because Tom Tom's refund appeared on the statement under the name BIBIT – Tom Tom's payment processor.

One call from the Adviser team, and the smoke cleared.

Tom Tom has agreed to offer Ms Owen-Keenan a goodwill token. We think the company could have avoided this situation by making it clear on the customer's account statement how the

refund would be paid. As for the problems alluded to in the upgrade, Tom Tom said it had not received a significant number of complaints.

A final point: if a refund is offered after a complaint and a debit or credit card was used to make the purchase, check that the card will not expire in the period when the refund is to be made. Most companies will issue payments of all kinds only once a month, so allow up to four weeks for the refund. Refunds credited to expired cards are not lost as the paying company would be contacted, but this would invariably lead to unnecessary confusion.



## KNOW YOUR RIGHTS

- In England and Wales, the retailer must prove that faults found within six months of purchase are not inherent.

- Consumers should not suffer financial loss in order to repair a faulty item, so postage and courier fees should be claimed back if the fault is inherent.

- Companies are not obliged to repair goods damaged by accident or misuse.

- The contract of sale is between the buyer and the company that accepted your money. It can be quicker to deal direct with manufacturers, but do not let resellers bully you into this.

- Goods ordered online, by post or phone can be returned within a reasonable time under the Distance Selling Regulations. This is widely accepted as being seven days.

- Companies cannot charge for services they fail to deliver, regardless of any contract you have signed – the contract goes both ways.

- Benefits provided under extended warranties are an addition to your statutory rights, so buying one does not invalidate your consumer rights under legislation.

- Online auction sellers are only obliged to ensure goods are described accurately. However, individuals selling more than one of an item, and those listed as power sellers, may be classed as businesses rather than individuals.

- For more detailed information on consumer law in England and Wales, visit [www.ofc.gov.uk/](http://www.ofc.gov.uk/) consumer. In Scotland, visit [www.scotscourt.gov.uk](http://www.scotscourt.gov.uk).

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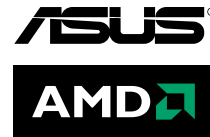


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- Sound Card High-End Onboard 8 channel sound
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- High-End ASUS® Motherboard Dual DDR, S-ATA, x16 slot, 3 PCI, 3 PCI-EX
- Six USB 2.0 Ports (4 Rear + 2 Front)
- DVD Writer 4x +R Dual Layer DVD-Writer(16x +/-R) (& RW) + 40x CD-RW
- Sound Card High-End Onboard 6 channel sound
- Network Facilities 10/100 Network Card
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# Gordon Laing



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## Great quality, shame about the noise

*Gordon Laing is impressed with the Xbox as a streaming device for Windows XP MCE PCs, but there's a fly in the ointment*

**W**hen Microsoft announced the specs for the Xbox 360, I got very excited. Not because I'm into games though: I was interested in its media streaming capabilities. In an earlier column I explained why the Xbox 360 may be bought by people who have no intention of playing a single game. They want the device's ability to stream music, photos and recorded TV shows from a Windows XP Media Center Edition (MCE) PC alone.

Media streaming appliances are nothing new but, apart from a basic program for US owners of the original Xbox, none have worked with Windows MCE PCs. All that has now changed with the Xbox 360 console, into which is built the required Media Center Extender software. The consoles have been in short supply, but I got hold of one and here's what you can expect.

### 'I had visions of retiring the PC to a back room and using the Xbox as the main client'

The Xbox 360's streaming facilities are ultimately designed to work with a Windows MCE 2005 system. If you install Windows Media Connect software on a non-MCE system, you'll still be able to stream photos and music, but to access video files and TV recordings along with remote scheduling, you'll need an MCE 2005 PC.

As a 100 per cent Microsoft solution, certain codecs are unsupported, including DivX. While you could re-encode these into Windows Media on the fly for streaming to an Xbox, it's not ideal. So if you have a big collection of DivX files, you'll be better off playing them directly from the media PC itself or looking for a different streaming solution.

I connected the Xbox 360 to my home network and began getting it to talk to my own home-built MCE PC. First make sure your MCE 2005 PC is running the hefty Rollup 2 installed from Windows Update. I thought this would allow the Xbox 360 to connect without further delay, but you need to visit [www.xbox.com/pcsetup](http://www.xbox.com/pcsetup) on your PC and follow the instructions to complete the configuration. The process includes entering a pass-phrase into the console and the PC for security, just like a Bluetooth pairing.

Once completed, you can select the Media section of the Xbox 360's dashboard and fire up the Windows Media Extender. Unlike the original Xbox, the experience is now virtually the same as using the PC itself. The menu system features the same animations and you can access and play any music, photo or TV recording on your PC.

The Xbox Media Extender goes beyond just streaming existing files though. You can stream live TV, although this will be limited to the number of spare tuners in your PC – so if you have two and both are recording different channels, the Xbox will either have to show one of them or stop one of the recordings. You can also fire up the programming guide and schedule new recordings for the PC. It all works very well.

The thing I was really interested in, though, was the picture quality. Media PCs are all very well, but I've never managed to achieve a connection to a TV which could match the quality of a standard consumer appliance. The quality from the Xbox 360's outputs, however, was as good as any of my consumer appliances, especially using the Component video connection – it certainly looked much better than when I'd connected my Media PC directly to the TV.

So far so good. This was exactly what I wanted from the Xbox 360 and I had visions of retiring the PC to a back room and using the console as the main client in the lounge. There was just one problem: noise. Microsoft may have cunningly allowed the Xbox 360 to slow down most of its cooling fans when working as a Media Extender, but it's still loud. In media mode it may be whisper quiet compared to the rocket-launch volume of the fans when it's playing games, but it's still considerably louder than my Media PC.

For me that's a deal breaker. I was impressed by the functionality of the Xbox 360 and quality of its outputs, but the noise was too much for a discrete media experience. Microsoft clearly wanted a compact form factor for the console, but I'd have sooner had a larger box with more opportunity for quieter cooling. This won't stop the console selling in droves, but I reckon the perfect streaming appliance for Windows XP MCE PCs has yet to be made. **PCW**

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# Barry Fox



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## I've got the multiformat blues

*Barry Fox explains why the new Blu-ray and HD-DVD standards could be dead in the water before they even launch*

**T**he first blue-laser optical drives and players limp onto the market in a few weeks. Don't be fooled by the happy absence of regional coding, Image Constraint Tokens (ICT) and Digital Only Tokens (DOT) that stop American discs playing in Europe and disable or downgrade the quality of analogue viewing.

The first players are being launched under an 'interim' licence from AACS-LA (Advanced Access Content System Licensing Authority), which controls the AACP (Advanced Access Content Protection) used by Blu-ray and HD-DVD. The final licence, due next year, will enforce ICT and DOT.

The Blu-ray group says it will use regional coding as soon as possible. HD-DVD will have to follow suit. There will be three numbered regions; 1 for America, Japan and Asia, excluding China; 2 for Europe and Africa; and 3 for China

## 'The thought of a terabyte home recorder to download HDTV movies is very attractive'

and Russia. It will be far tougher to hack than DVD's flimsy regional coding system.

The blue-laser standards battle is not a re-run of VHS versus Betamax. When that war was declared, everyone wanted a video recorder – it was just a question of which format won. Blue laser is a re-run of DVD-Audio (DVD-A) versus Super Audio CD (SACD); or recordable DVD; or UMD (Universal Media Disc) movies for the Playstation Portable (PSP).

DVD-A and SACD were offered to people who were happy with CD and DVD. Most spent their money on iPods instead, so Apple won that battle.

There were five recordable DVD formats, six if you add the fact that DVD-RW blanks can be formatted in two different ways; DVD-VR mode for editing but no playback on most DVD players and video mode with no editing and better compatibility. DVD recorders now handle four kinds of blank. Only DVD-Ram is usually left out.

The result is a pig's ear, with headache-making instructions on using all the format, edit and finalise options depending on your media type. In practice, this means VHS is being replaced by hard disk recorders – a terabyte home recorder is due soon.

Sony dreamed up the UMD format, the non-standard read-only mini-DVD, as a way of pirate-proofing movie playback on a PSP. But although games are global, Hollywood regionally codes UMD movies. It is easy to copy movies from DVD to Memory Stick and then play them on a PSP – with no regional coding. So UMD movies are flopping.

Sony already reads the writing on the wall. The company's latest hard disk recorder grabs broadcast TV in mpeg2 and mpeg4 at the same time. An hour of mpeg4 then takes only two minutes to transfer to the PSP memory via USB.

Sony's Location Free TV is a new 'place-shifting' system that lets a PSP with Wifi Internet access tap into your home TV and video recordings. The control software is already available, ready for a summer launch of the base stations that connect a home TV to broadband.

I recently watched BBC TV in a Tokyo café; if I had paid Boeing for inflight Wifi I could have watched it on the plane. Students in digs should be able to watch Sky Sports recordings.

So who needs UMD movies? And who will choose one blue-laser format over the other and risk becoming the mug who bought Betamax?

There is already talk of a blue-laser deck that takes both formats; it will cost more and confuse users just like a multi-standard DVD recorder.

The computer companies tell us we need blue-laser drive for PCs. I'd certainly like a cheap removable disc that can run a full system backup, unattended overnight. But PC hard drives already far outstrip the 25GB coming from blue laser.

Both blue-laser systems use AACS copy protection. A player's encryption is automatically updated to defeat hackers, by using hidden code on new movie discs. But if something goes wrong or a hacker gets in, the player is rendered useless.

AACS-LA has still not thrown AACS open to pre-launch challenge, as the music industry did with the Secure Digital Music Initiative (SDMI) protection systems. Princeton University, you will recall, hacked this and SDMI admitted defeat. AACS-LA ducks comment and remains 'not able to confirm who the appropriate contact is at this time'.

A terabyte home recorder, downloading HDTV movies from the Internet or by satellite, looks more attractive every day. **PCW**

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# Guy Kewney



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## The problem with programming a house

*Guy Kewney thinks we won't achieve fully automated homes until systems can integrate without irrational copyright barriers*

Suppose your home is a computer. How would you program it? To quote Deep Thought (the computer in *The Hitchhiker's Guide to the Galaxy*): 'Trrrrrricky!' The problem is, there isn't a home-integration system.

You'd want to be able to write commands such as 'open front door', 'move audio output from TV room to upstairs loo' or even 'lock bedroom door, dim lights, play Dire Straits'.

More to the point, you'd want to be able to link the bedroom door to the security camera or allow the hob to send messages to the oven, or the TV to negotiate bandwidth with the cable modem. And if you bought a new fridge, you wouldn't want to have to rewrite all the code.

In today's domestic environment, you have to deal with each device separately. If you have an 'e-fridge', it can indeed be programmed to read

and transferring data from one system to another; and 'automation' isn't possible.

Biztalk creates the interface into which all business functions can be plugged, through which they can exchange data. Inevitably, it's huge, unwieldy and takes rather more time to explain than a 10-minute demo, but that's it in a nutshell.

So when will we have a Hometalk Server? I was invited to see Home 2 at BT's research facility last month and it had all the things you'd want: a stereo TV, Ethernet on the mains cables and wireless webcams looking at the door.

And none of it worked together. Microsoft has been looking the wrong way; it's been working on what it calls a 'media centre' computer concept. In fact, it's little more than a big flat-screen TV with Microsoft's copyright-enforcement software inside.

I think copyright enforcement in the age of the Internet is doomed. You can make life difficult for people who use one medium, yet all that achieves is to make them use another medium. And copyright owners connive in this: providing things free so newcomers will discover and like their material and end up being prepared to pay for it.

What isn't doomed is rational integration: the creation of a shared background intelligence. It has to know where you store your data, where to find things and which of them are compatible – and you don't. That's what automation is.

Whether automation is good for us is another question. You can argue it is making us incapable of risk management and risk assessment in our private lives. In a world where it is proposed that hot water should be impossible to get out of a hot tap because someone might scald themselves, risk management is hard to learn. But automation is what we're trying to achieve.

When a URL appears at the bottom of a television news item and I can click on it, I'll know someone has cracked it. But if the only fruits of integration continue to be stupidities such as Google's media player, which 'downloads' a video of 1KB that you can't play when you're offline because it needs to talk to the Google copyright server to play, then I'll know they don't see any profit in true automation.

The sad thing is, I'll bet they don't make money out of their copyright-management stuff, either. **PCW**

## 'Automation is making us incapable of risk assessment in our private lives'

barcodes off products and note use-by dates. But the average fridge can't communicate with your online supermarket account and find out how quickly they can deliver orange pimentos.

You can get an idea of what this system would look like if you study Microsoft's Biztalk Server.

It's almost impossible to get a sensible description of this product. Ask the experts and they retreat into gobbledygook. 'Business process management' they say, as if these three words conveyed meaning to anybody who didn't already know what they meant. But the idea is as simple as the 'home operating system' and just as complex to create. It's the idea of turning the whole business into a programmable entity.

In your home office, for example, you don't have to rewrite your word processor if you sell the monochrome laser printer. You merely install the new drivers for the new colour inkjet – and suddenly all the printouts are in colour.

A personnel department, of course, doesn't have drivers. If you sign a contract with a new building contractor, the contractor doesn't come with a standard interface to the purchasing office; instead, humans start printing out bits of paper

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## WHAT'S NEW THIS MONTH

The Mesh Pegasus SLI is one of a handful of new models to ship with two Nvidia Geforce Go 7800GTX cards. Unsurprisingly, it stormed through our benchmarks, leaving the majority of desktop systems in its wake. Of course, portability takes a bit of a knock and it's not the kind of notebook you'll be taking with you on a commute. Read the full review on page 44.

Apple's Intel crusade continues with an updated version of the Mac Mini. It's more expensive than the previous model and Apple still hasn't addressed the 3D side – it still runs off integrated graphics. Find out what we thought on page 48.

We also have a selection of group tests, including the latest entertainment PCs and a collection of miniature TV tuners.

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## OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

## OUR AWARDS

**Editor's Choice:** The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.

**Recommended:** A product that combines great features, usability and value for money.

**Great Value:** Not the best in class, but a product that has superior features and performance for the price.



Editor's Choice



Recommended



Great Value

# REVIEWS



'Lightning-fast performance and whisper quiet, Chillblast's Atlantis Crossfire is a gamer's dream machine.'

Read the review on page 45

SLI NOTEBOOK

# Mesh Pegasus 7800 SLI

Nvidia's portable SLI technology redefines notebook gaming



When Nvidia beat arch-rival ATI to create a dual-graphics card system back in early 2005, we were treated to some of the most impressive benchmark scores to date. Now, barely a year on, Nvidia has done it again with the SLI (scalable link interface) for notebooks.

Various manufacturers are releasing notebooks that support this new technology. Evesham, Rock and, as featured here, Mesh, are all using the same Clevo M950K chassis.

The notebook makes use of an AMD Turion 64 Mobile MT-40 processor with a clock speed of 2.2GHz. A total of 2GB of DDR400 Ram sits alongside the processor.

But it's the graphics we're interested in. Inside the gargantuan case lie two Nvidia Geforce Go 7800 GTX cards, each with their own 256MB of dedicated Ram.

We expected the Pegasus 7800 SLI to return some exceptional benchmark scores, and we weren't disappointed. The previous top-performing notebook to pass through the PCW Labs was Evesham's Voyager C720 (see [www.pcw.co.uk/2146394](http://www.pcw.co.uk/2146394)), which notched up 6,885 in 3Dmark05 with its single Geforce Go 7800GTX. Although Mesh's SLI behemoth can't double this, it still managed to blitz to a score of 9,881. Take it from us; this notebook will have no trouble running the latest games.

Of course, there's no point having powerful graphics if you don't have a screen with a decent native resolution. Thankfully, the Pegasus 7800 SLI comes with a 19in display (the largest we've seen on a notebook) with a widescreen resolution of 1,680 x 1,050.

Viewing angles are good and overall image quality is impressive, but we've seen better.

A DVI port sits on the back of the chassis should you want to hook up an external display, but if you're likely to be using a separate monitor most of the time, you might want to consider purchasing a standard desktop and saving yourself some money.

The 80GB hard drive is a little disappointing, but purchasing an external drive to use in conjunction with it won't exactly make much impact on the overall weight if you do need to shift it to another location.

With such a large chassis, fitting in extra bits and bobs was never going to pose a problem. NEC's ND-6500A eight-speed dual-layer DVD writer sits to the left next to the audio outputs. Five USB2 ports and a single Firewire one, as well as a multifunction card reader are also available.

Naturally, 802.11b/g Wifi is present, while Bluetooth and infra-red are offered as alternatives.

Whether this can actually be classed as a notebook is up for debate. At 6.7kg there's simply no way you'll be carrying it around on a regular basis. It will also start crying out for power if you try using it away from the mains for any length of time. It's best not to think of it as a notebook, but rather a portable all-in-one small form factor PC that you can carry in and out of different rooms in your home without having to unplug a monitor and detach the keyboard and mouse.

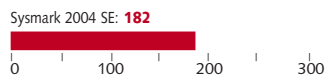
Beating the majority of desktop PC systems in our 3Dmark05 benchmark, there's no doubt the Pegasus 7800 SLI has taken a massive leap in terms of notebook gaming. The Turion 64's performance isn't quite as impressive, but we fully expect to see a similar model with a desktop processor in the near future.

Naturally, we're also looking forward to ATI's Crossfire response.

Will Stapley

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## Performance



\*Tested at 1,024 x 768 in 32bit colour

## Details

- Price** £2,199  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Mesh  
[www.meshcomputers.com](http://www.meshcomputers.com)  
**Specifications** AMD Turion 64 MT-40 (2.2GHz/25w) • 2GB Ram • 2 Nvidia Geforce Go 7800GTX 256MB graphics cards • 19in screen (1,680 x 1,050) • 80GB hard drive • 5.1 surround sound • Dual-layer DVD writer • 802.11b/g • Firewire • 5 USB2 • DVI port • Bluetooth • 4-in-1 card reader • 1.3megapixel camera • Windows XP Home • 3-year warranty

## Verdict

- Pros** Graphics; screen; 2GB of Ram  
**Cons** Processor; bulky and heavy  
**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★☆☆  
**Overall** Expensive, but a giant leap forward for portable gaming  
 ★★★★★☆

**DESKTOP PC**

# Evesham Axis Dominator 79GT

A good value-for-money PC running one of Nvidia's latest graphics cards



**E**vesham is the first to launch a PC with one of Nvidia's 7900-series graphics cards. Instead of going for the high-end 7900GTX version, however, Evesham has opted for the Geforce 7900GT.

Performance isn't as good as the GTX or ATI's Radeon X1900 XTX, but this PC is better value for money and, unless you're looking for top-notch gaming speeds, will be adequate. Fast graphics are backed up by a dual-core AMD Athlon64 X2 4200+ and 1GB of Ram (two 512MB PC3200 Dimms).

Compared to the Decimator chassis of Evesham's Axis FX 60 Fireball, the Dominator 79GT's black panelling looks mundane.

Under a small flap on the front of the case are two USB2 and a Firewire socket, plus audio connections. Two Sony drives (a dual-layer DVD writer, and a DVD-Rom) take care of optical storage, and you also get a 250GB 7,200rpm Western Digital hard drive.

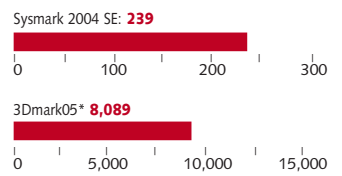
Viewsonic's VA1912 monitor is a 19in widescreen TFT with a 1,440 x 900 native resolution. The contrast ratio of 500:1 and 8ms response time are respectable.

Although Windows Media Center Edition is included, there's no TV tuner to take full advantage of it. You could, however, add an internal or external tuner.

The Dominator 79GT flew through our Sysmark 2004 SE benchmark and achieved a score of 239. Meanwhile, the Geforce 7900GT graphics card helped 3Dmark05 to 8,089 at the standard resolution of 1,024 x 768, which beats previous PCs we've seen with Nvidia's 7800GTX. Creative's I-Trigue 3220 2.1 speakers won't blow you away, but will suffice for general PC use.

Evesham has included some of the latest technology in this PC while keeping the price down. It's not quite under the £1,000 mark, but it's still a good-value system. *Will Stapley*

**Performance**



\*Tested at 1,024 x 768 in 32bit colour

**Details**

**Price** £1,099  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Evesham  
[www.evesham.co.uk](http://www.evesham.co.uk)  
**Specifications** Athlon64 X2 4200+ • 1GB PC3200 Ram • 250GB hard drive • Nvidia Geforce 7900GT 256MB • Viewsonic VA1912 19in TFT • Sony DVD-RW & DVD-Rom • Creative I-Trigue 2.1 speakers • 3-year warranty

**Verdict**

**Pros** Powerful graphics and processor; reasonable price  
**Cons** 2.1 speakers; no TV tuner  
**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★  
**Overall** A TV tuner would have been good, but it's still a powerful system at a good price  
★★★★★

**DESKTOP PC**

# Chillblast Atlantis Crossfire

Two graphics cards, 800GB of storage, an overclocked FX-60 and water-cooling



It only takes a brief glance at the specs to see why Chillblast is asking well over £3,000 for this monster. We expected to see a dual-graphics card setup and a fast processor, but we didn't anticipate that the whole system would be water-cooled. To highlight this, Chillblast has mounted the water reservoir at the front of the PC for all to see.

The Atlantis Crossfire runs off an Athlon64 FX-60. When AMD released this processor, many were disappointed that it only had a core clock of 2.6GHz

(200MHz slower than the FX-57). Indeed, Chillblast decided to whack the core up to 2.9GHz with a 233MHz front-side bus and multiplier of 13x. Chillblast tells us it tried pushing the FX-60 further, but stability became an issue.

ATI Radeon X1900 XTX and X1900 XT Crossfire Edition graphics cards link up to provide staggeringly powerful graphics. Both have a massive 512MB of Ram at their disposal. Two 150GB drives sit in a striped Raid array while another 500GB drive pushes the total storage to just 200GB shy of a terabyte.

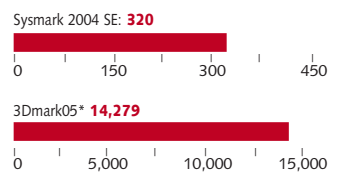
The end result of these high-spec components is a ludicrously fast PC. In Sysmark 2004 SE it scored an astonishing 320, while 3Dmark05 caused it no problems at all with a result of 14,279. Both are way ahead of any other system we've ever reviewed. You'll find full performance scores at [www.reportlabs.com](http://www.reportlabs.com).

Both the CPU and graphics make use of the same Nexxos Alphacool water-cooling system, which provides quiet and efficient cooling.

Lightning-fast performance and whisper quiet, this is a gamer's dream machine.

You can find a more in-depth review of the Chillblast Atlantis Crossfire on the PCW website at [www.pcw.co.uk/2152952](http://www.pcw.co.uk/2152952). *Will Stapley*

**Performance**



\*Tested at 1,024 x 768 in 32bit colour

**Details**

**Price** £3,524.99  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Chillblast 0845 456 7830  
[www.chillblast.com](http://www.chillblast.com)  
**Specifications** Water-cooled Athlon FX-60 CPU (2.9GHz) • 2GB Mushkin PC4000 Redline DDR-Ram • Asus A8R-MVP motherboard • Water-cooled ATI Radeon X1900XT-X 512MB & Crossfire • 2 NEC 4551 dual-layer DVD-RW drives • 2 Raptor 150GB hard drives (Raid 0) • Seagate Barracuda 500GB drive

**Verdict**

**Pros** Powerful; quiet; components  
**Cons** Overkill for most users  
**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★  
**Overall** Quiet, powerful and one of the fastest PCs around  
★★★★★

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**British Airways to axe over third of its managers**  
**British Airways (BA) chief executive Willie Walsh** ©AFP/British Airways/File

LONDON (AFP) - British Airways is to get rid of more than one third of its managers over the next two years under a restructuring programme that aims to slash costs across the group.

The job cuts of almost 600 managerial posts, or 35 percent of the total, were set to save the airline 50 million pounds (73 million euros, 86 million dollars) as part of its drive announced in January 2004 to achieve a 300-million-pound cost reduction programme by March 2007, BA said in a statement Wednesday.

The restructuring will see a total of 597 management posts lost by March 2008. The number of senior managers will be reduced by half to 207 and there will be a 30 percent reduction in the number of middle managers to 911 from 1,301.

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**Hurricane Katrina to cost Lloyd's 1.9 billion pounds**  
**Residents wade through a flooded street in New Orleans** ©AFP/File James Nielsen

LONDON (AFP) - Lloyd's, the world's biggest insurance underwriting market, raised its estimated pre-tax loss from Hurricane Katrina to 1.9 billion pounds (2.8 billion euros, 3.3 billion dollars) from 1.4 billion. Lloyd's also forecast that Hurricane Rita would cost it 535 million pounds and that Hurricane Wilma would add 483 million to the total.

As a result, the market said that chances of posting a profit for 2005 were weak.

"The net loss from Katrina is now estimated at 1.9 billion pounds," Lloyd's said Wednesday in an official statement. "This compares with the provisional estimate of 1.4 billion given by Lloyds on 14 September which was based on the very limited information available at the time."

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AMD NOTEBOOK

# Mesh Pegasus 7800GTX

A bulky yet powerful desktop replacement with plenty of features



**A**t a hefty 5.75kg, Mesh's Pegasus 7800GTX appears packed with goodies and gadgets, which will appeal to people who want a desktop replacement but are concerned about the restricted features of a standard notebook.

The weight of this notebook is partly due to its stocky construction. While there's no design requirement for this (it isn't going to be carted around by many people, so there's no real reason to make it particularly rugged), the construction is still admirably sturdy.

The 17.1in screen is of a decent thickness, meaning that unlike some other notebooks we've seen, the display housing is rigid. It has less of the anti-glare coating that's become popular recently, but gives far better contrast and brightness than other TFT screens.

As for features, the Pegasus comes with a 256MB Nvidia Geforce Go 7800GTX – hence the model name. This helped it to 6,681 in 3Dmark05. Although this is nothing compared to what you'd expect from a similarly priced desktop, it's impressive for a notebook.

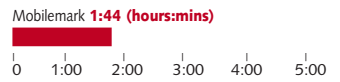
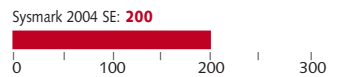
Continuing the high-performance theme, it scored 200 in Sysmark 2004 SE. Given that it's powered by an Athlon64 X2 4400+, complete with 2GB of DDR400 Ram, we expected no less. See the full performance results at Reportlabs ([www.reportlabs.com](http://www.reportlabs.com)).

The notebook comes with a dual-layer DVD drive, 80GB hard disk and a multiformat memory card reader. Networking options are provided in the form of Gigabit Lan, Bluetooth and 802.11g Wifi.

To make further use of the large high-quality display, Mesh has included a TV tuner with remote control.

Long battery life isn't vital as the Pegasus isn't designed to be away from power for long. But one hour, 29 minutes for DVD playback and one hour, 44 minutes of general use, is respectable. *Anthony Dhanendran*

## Performance



## Details

**Price** £1,999  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Mesh 08700 464 747  
[www.meshcomputers.com](http://www.meshcomputers.com)  
**Specifications** AMD Athlon64 X2 4400+ • 2GB of DDR400 Ram • 80GB hard disk • 17.1in WSXGA+ TFT (1,680 x 1,050) • 256MB Nvidia Geforce Go 7800GTX • 802.11g • Windows XP Home • 3-year collect and return warranty • 5.75kg

## Verdict

**Pros** Fast graphics and processor; good-quality screen; plenty of features

**Cons** Battery life; heavy design

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** It's big and bulky, but does pretty much everything you could want from a notebook PC

★★★★★

INTEL MAC

# Apple Mac Mini

Following on from the IMac, Apple's miniature computer gets a similar makeover



**W**hen it was first released, the Mac Mini was the cheapest Mac Apple had ever come up with. It was also responsible for tempting quite a few PC owners into using a Mac for the very first time.

So we were initially disappointed to see that prices for the new Mac Mini start at £449 and go up to £599 – a good £100 more than previous versions. But, in return, you do get a lot more power and some good hardware and software features.

Apple is now using Intel processors in all its new machines, so the new Mac Mini dumps the ageing G4 processor in favour of the speedy new Intel alternatives

For £449 you can get a Mini with a 1.5GHz Core Solo (single-core) processor, 512MB of Ram, 60GB hard disk and a DVD-Rom/CD-RW drive. However, our review unit was the more expensive £599 model, which has 1.66GHz Core Duo (dual-core) processor, 80GB of Ram and a DVD-RW drive.

Both models have built-in wireless networking, USB, Bluetooth, Firewire and digital audio in/out. You also get the excellent iLife '06 software suite included.

This Core Duo model is a good performer, running almost twice as fast as the old Mac Mini for certain tasks, such as handling video files or ripping mp3s. The Core Solo model wasn't available for review, but the indications are that it provides a respectable 25-30 per cent speed increase over the previous Mac Mini.

One disappointment is the use of an Intel integrated GMA950 graphics processor. This is good at handling video files, but not too hot on 3D performance.

Still, as a general-purpose home or office computer the new Mini works well. The speed increase is worth the higher price, and it's still cheaper than PC rivals such as Evesham's Mini PC. *Cliff Joseph*

## Details

**Price** £599 (Core Solo model: £449)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Apple 0800 039 1010  
[www.apple.com/uk](http://www.apple.com/uk)  
**Specifications** 1.66GHz Core Duo processor • 512MB of Ram • 80GB hard disk • DVD-RW drive • Integrated Intel GMA950 graphics processor (64MB of shared system memory) • 1 Firewire, 4 USB2 • Ethernet • 802.11g • Bluetooth 2 • Remote control • iLife '06 software suite

## Verdict

**Pros** Versatile; compact; quiet; good for office or home

**Cons** Poor 3D performance; no monitor, mouse or keyboard

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** Good option for those wanting to try out a Mac or upgrade their old machine

★★★★★

**24IN MONITOR**

# Eizo Flexscan S2410W

This dazzling display might be expensive, but it's still good value for money



**B**igger brother to the Flexscan S2110W, the Eizo S2410W comes with an almost identical specification, yet a considerable increase in screen size.

A range of high-end features make this monitor ideal for graphics professionals and enthusiasts who demand the ultimate control over their display.

Precise control over colour is available using a 10bit Lookup Table (LUT), rather than the usual 8bit versions, and Gamma values can be adjusted between 1.4 and 3.0 in increments of 0.2.

Individual hue and saturation adjustments can be made in both RGB and CMYK colour modes.

In our tests, performance was slightly inferior to the S2210W in terms of brightness and colour accuracy, but still way ahead of most monitors we've reviewed.

Six different viewing presets are provided with pre-programmed brightness, colour temperature and gamma settings.

A programmable user mode is also provided along with a Text mode, which reduces the brightness from a dazzling 450cd/m<sup>2</sup> to more comfortable levels at the touch of a switch.

Both the S2410W and the S2110W are available in black, silver or white cabinets. We reviewed the latter and the more visible controls mean it's easier to use than the black chassis.

Build quality is superb with a uniquely flexible stand that can arc the monitor into a book-reading position.

While the S2110W's price is considerably higher than competing monitors, the S2410W is less than £100 more expensive than products such as Dell's popular 24in panel, the Ultrasharp 2405FPW, but with a far higher specification. So, if you can afford it, the S2410W offers considerably better value for money than the 21.1in version.

*Paul Monckton*



## Details

**Price** £1,028.13  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Eizo [www.eizo.co.uk](http://www.eizo.co.uk)  
**Specifications** 24.1in (1,920 x 1,200) • S-PVA panel • 16:10 aspect ratio • 8ms response time • 1,000:1 contrast ratio • 450cd/m<sup>2</sup> brightness • 178° horizontal and vertical viewing angles • Integral power supply • Dual DVI-I inputs • ISO 13406-2 Class 2 • 566 x 230 x 359mm (w x d x h) • 10.2kg • 5-year warranty

## Verdict

**Pros** Accurate colour; brightness, contrast and viewing angles

**Cons** Performed slightly worse than the 21.1in version

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** Excellent performance and considerably better value for money than the 21.1in version

★★★★★

**20IN TFT**

# Sony MFM-HT205

An elegant multimedia monitor with superb image quality and a built-in TV tuner



**T**he MFM-HT205's gently curved vertical sweep of silver gives the 20in 16:10 format MVA panel a seductive minimalist look. There is a vast selection of input connectors and the dual analogue and DVI inputs with individual audio jacks are perfect for your PC, while Scart; composite, component and S-video connections let you connect it to just about anything else.

Furthermore, it is HDCP compliant so will be compatible with future copyright-protected content.

The addition of an analogue TV tuner and rather attractive full-sized remote control make it one of the most versatile monitors you can buy.

There's also plenty of oomph in the integral 3w per channel stereo speaker system with 5w subwoofer.

Of course, all this would count for nothing if the performance weren't up to scratch. For use as a television, especially if you're going to watch it comfortably from across the room, you'll need plenty of brightness and contrast. The MFM-HT205 delivers both in spades.

Its maximum brightness of 470cd/m<sup>2</sup> and a rated contrast ratio of 1,600:1 are among the highest we've seen. Using Sony's X-Black LCD technology it has a smooth, dark-looking panel which delivers very deep blacks and rich colours.

The monitor is very easy to set up, especially using the remote control. Preset modes for different uses ensure that movies are bright and dynamic while spreadsheets don't burn your eyes out. And while everything is configurable enough to satisfy the twitchiest tweak freak, features such as an ambient light detector and copious 'auto' options make it equally appealing to those who just want to plug and play.

*Paul Monckton*

YYePG Proudly Presents, Thx for Support



## Details

**Price** £649  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Sony [www.sony.co.uk](http://www.sony.co.uk)  
**Specifications** 1,680 x 1,050 • MVA panel • X-Black screen • 16:10 aspect ratio • 6ms response time • 1,600:1 contrast ratio • 470cd/m<sup>2</sup> brightness • 170° horizontal and vertical viewing angles • Analogue, Scart, S-video, composite, component video and DVI-D • DVI-HDCP compliant • Analogue TV tuner • Remote control • ISO 13406-2 Class 2 • 3-year warranty

## Verdict

**Pros** Image quality; connections

**Cons** No height adjustment

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** Excellent high-resolution picture quality from a monitor you won't want to hide

★★★★★

## DLP PROJECTOR

# Samsung SP-P300ME

Small, quiet and ultraportable, but not the brightest of projectors



**S**amsung's SP-P300ME DLP-based projector measures an astonishingly small 172mm wide by 95mm deep, and weighs a paltry 70g. It differs from standard projectors in that it uses LEDs instead of a lamp.

LED projectors bring with them plenty of advantages over more traditional models, the most obvious being a huge reduction in size. Furthermore, since they require little power, operation via a battery is possible. A battery for the Samsung SP-P300ME is available for £139 and will power it for over two hours.

Heat generation is also very low, so there's no need for noisy cooling. You'll hear a fan whirring away inside the SP-P300ME, but it's far quieter than the racket created by standard projectors.

They also start projecting the image almost as soon as you turn them on (unlike standard projectors, which can take a fair amount of time to warm up), and there's no lamp to cool down after use.

However, there are also a few disadvantages to using LED technology in a projector. LEDs aren't particularly bright – in fact, compared to standard projector lamps, they're positively dull. Rated at 25 ansi lumens, the SP-P300ME is never going to be able to compete with the 1,500+ ansi lumens rating of most projectors. Business users will need to pull down all the blinds when giving a presentation, while those wanting to watch a movie at home during the day will need to invest in some heavy-duty curtains or revert to their standard TV. Also, the small size means there's no internal speaker.

Despite the low specifications, we were able to get some surprisingly good results. Samsung's maximum quoted projection size is 63in – anything larger than

this and you start to lose out in terms of image quality. But in a near pitch-black room we watched an entire football match on an 83in widescreen projection and were impressed with the quality.

We tried watching a few films using the projector. Although it coped for the most part, low-light scenes troubled the SP-P300ME a fair amount – certainly not to an unwatchable extent, but annoying nevertheless.

The native resolution of 800 x 600 will disappoint those looking to use it in conjunction with a laptop. This low resolution also means high-definition video isn't supported.

While we enjoyed testing the SP-P300ME, we're left wondering what sort of market it will have. Although it's by no means expensive, the price tag of £599 is slightly higher than we were previously led to believe. Business users will delight in being able to carry a battery-powered projector around with them for impromptu Powerpoint sessions, but if you want a projector to go with your home-cinema setup, you'd be better off purchasing a larger but higher-performing model. The Viewsonic PJ400 is a good choice and is now slightly cheaper than this Samsung model.

Alternatively, you might want to hold on to your money for a bit and see what the likes of Mitsubishi and Viewsonic can come up with in terms of LED projectors.

Despite its shortcomings, there's no denying the Samsung SP-P300ME represents a huge advance in projection technology. If you don't mind sacrificing brightness for portability, it's well worth considering.

Samsung tells us Microanvika will be selling this projector, although at the time of writing there was no listing for the SP-P300ME on the site. *Will Stapley*

YYePG Proudly Presents, Thx for Support

## Details

**Price** £599

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Samsung  
[www.samsung.co.uk](http://www.samsung.co.uk)

**Specifications** 25 ansi lumens  
• 1,000:1 contrast ratio • 16:9, 4:3 aspect ratios • 12.5-63in quoted image size • 800 x 600 native resolution • Composite, VGA input  
• 172 x 95 x 51mm (w x d x h)  
• 70g (without battery)

## Verdict

**Pros** Extremely small; battery option; quiet

**Cons** Requires dark environments; low resolution; limited inputs as standard

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A significant step in projection technology, but this first-generation model will only suit a small number of environments

★★★★★



## KN1 SLI LITE

(PCWORLD CODE: 126359)

### ● SLI-ready for AMD platform



- NVIDIA nForce4 SLI chipset
- Supports AMD Athlon™ 64 CPU
- System Bus 2000MT/s
- Dual DDR400 up to 4GB
- Gigabit LAN
- 8-channel Audio
- 2 PCI-E x16 + 1 PCI-E x1 + 3 PCI
- 4 SATAII with RAID 0, 1, 0+1, eSATA



## PF5 Extreme

(PCWORLD CODE: 671870)

### ● Ultimate digital experience



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- FSB 1066/800/533 MHz
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- Gigabit + 10/100 LAN
- 8-channel Audio
- 2 PCI-E x16 + 1 PCI-E x1 + 3 PCI
- 6 SATAII with RAID 0, 1, eSATA/0+1, 5



## RS400-A

(PCWORLD CODE: 801212)

### ● DDR + DDRII and AGP + PCI-E support



- ATI RS400 & SB400 chipset
- Supports Intel LGA775, Pentium 4
- FSB 800/533 MHz
- Dual DDR or Dual DDRII up to 2GB
- Onboard VGA (Radeon X300 based)
- 6-channel Audio
- 1 PCI-E x16, 1 PCI-E x1, 1 AGP, 2 PCI
- 4 SATA with RAID 0, 1

### ● NFORCE4 - A939

Socket 939 for AMD K8 Athlon 64, NVIDIA Firewall, NVRAID, Gigabit LAN, Dual DDR 400, PCI-E x16, 6-channel Audio, 4x SATA with RAID 0, 1, 0+1

### ● NFORCES - A

Socket 754 for AMD K8 Athlon 64, NVRAID, 10/100 LAN, AGP 8x, DDR 400, 6-channel Audio, 4x ATA133, 2x SATA with RAID 0, 1, 0+1

### ● K8M800 - M2

Socket 754 for AMD K8 Athlon 64, 10/100 LAN, AGP 8x, DDR 400, ATA133, 6-channel Audio, 2x SATA with RAID 0, 1

### ● P4M800 - M7

Socket LGA775 for Intel Pentium 4 / Pentium D, Dual Core and 64Bit support, DDR 400, AGP 8x, CNR slot, Integrated shared S3 VGA, 6-channel Audio

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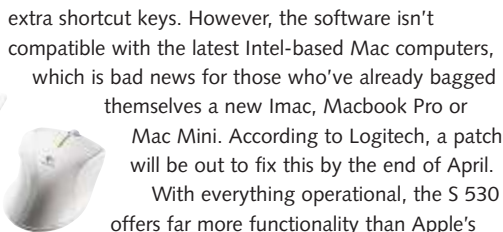
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**KEYBOARD AND MOUSE**

# Logitech Cordless Desktop S 530 Laser for Mac

A good-value, attractive, wireless set that's right on the button



**T**he Mac Mini doesn't come with a keyboard and mouse, so unless the plan is to use older devices, you'll have to pop to the Apple store to bag yourself a matching set. Or is there a better solution?

Logitech's Cordless Desktop S 530 Laser for Mac is almost identical to the PC version, the S 510. New features include the Mac-Mini-matching white and silver colouring, and extra Mac-specific buttons.

Rather than Apple's bespoke cordless solutions that use Bluetooth, the S 530 comes with a (white) USB mini-receiver that talks to both devices.

Setup is as you'd expect; add batteries to the keyboard and laser-tracking mouse, plug the adapter into a USB, and it will automatically detect the devices.

The accompanying Logitech Control Center software has to be installed to make use of all the

extra shortcut keys. However, the software isn't compatible with the latest Intel-based Mac computers, which is bad news for those who've already bagged themselves a new IMac, Macbook Pro or Mac Mini. According to Logitech, a patch will be out to fix this by the end of April.

With everything operational, the S 530 offers far more functionality than Apple's own products.

Due to its wireless nature, a USB hub can't be built into the keyboard, but there are one-touch buttons for iTunes, iPhoto (both part of iLife '06), Safari, Mail and Spotlight. All shortcut keys can be customised and there's an LED light to signify low battery.

The mouse also has buttons for volume, muting, and forward and back web-page navigation, while the middle wheel tilts left and right for document scrolling.

Logitech may have a point when describing the keyboard as ergonomic; however the jury is out as to whether its 19mm elevation is a help or hindrance for arms and wrists. Another bugbear is the mouse's right-hand-only operation.

At £70, it's undeniably better value than Apple's wireless keyboard and mouse, which sell for £39 each and offer far less versatility.

*Luke Peters*

**Details**

**Price** £70  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Logitech [www.logitech.co.uk](http://www.logitech.co.uk)  
**Specifications** Logitech S 530 keyboard • Logitech MX 600 mouse • USB wireless receiver • USB desk stand • Two AAA keyboard batteries • Two AA mouse batteries

**Verdict**

**Pros** Lots of shortcuts; versatile button customisation; simple setup  
**Cons** Some may find it uncomfortable; right-hand mouse only; currently doesn't work with Intel Macs

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** Cheaper and more versatile than Apple's own offering but currently incompatible with Intel Macs

★★★★★

**EXTERNAL HARD DRIVE**

# Western Digital My Book Essential Edition

A stylish device that would look good in a study or living room, but lacks a network option



**W**estern Digital has followed the likes of Lacie's Brick and created an external hard drive to stand out from the crowd. Called My Book and shipped in a box with livery similar to the Xbox 360's, this drive is clearly aimed at a mass market fed up with mundane-looking storage systems.

The chassis does indeed look like a book, while the series of holes around the side of the casing (this, according to Western Digital, is Morse code) means it's

able to run without cooling fans. The design allows it to be sat horizontally or vertically, and additional units can be stacked on top of each other.

The circular green light on the front of the casing pulsates when the drive is accessed. It's not possible to turn this off, but the relatively soft glow shouldn't irritate too much.

Having released the Net Center only a few months ago, Western Digital decided against including an Ethernet port on the My Book. Western Digital tells us a network version of the device may appear at a later date.

The My Book also comes in a Premium Edition that features a second circular light to indicate disk usage. You also get backup software (sadly lacking with this Essential Edition) and Firewire and USB connections.

The chassis is attractive but doesn't feel as sturdy as Lacie's Brick or Maxtor's Onetouch II Firewire 800 drive – however, the latter has to use a cooling fan.

The My Book is a competent device that will look good in the study or a lounge. The lack of a network option is disappointing, but including an Ethernet port would have pushed the price up. As it stands, £149 for this 320GB version is about average for external drives.

Other capacities are also available: 80GB (£79), 160GB (£99) and 250GB (£119).

*Will Stapley*

**Details**

**Price** £149  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Western Digital [www.westerndigital.com](http://www.westerndigital.com)  
**Specifications** 320GB • 7,200rpm • 8MB buffer • 8.9ms read time • 2ms seek time (average) • USB2 • 141 x 170.5 x 57.2mm (w x d x h) • 820g

**Verdict**

**Pros** Stylish design; no cooling fans  
**Cons** No backup software included; chassis could be more robust; no Ethernet port

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** The lack of a network port and backup software is disappointing, but this is a stylish external drive from Western Digital

★★★★★

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COMPACT DIGICAM

# Kodak Easyshare v570

A good-looking camera with two individual lenses



**K**odak's Easyshare v570 is a bijou, ultra-compact camera with a matt black and polished mirror-finish metal case.

The rear houses a comparatively large 2.5in LCD screen, while to the front a small metal lens cover slides aside to reveal not one, but two lenses, which together provide a total optical zoom range of 5x.

The lower of the two lenses has a 35mm equivalent zoom range of 39-117mm, while the upper one is a fixed, 23mm ultra-wide lens that gives you a tremendous field of view. Switching between the lenses happens automatically as you use a rocker-switch to zoom in and out.

The v570 lacks manual control or shooting modes such as shutter or aperture priority. Instead, it's filled with easy-to-use yet powerful features that are simple enough even for beginners.

These include built-in facilities for emailing pictures, as well as 22 scene modes to cover most shooting situations. The Panorama mode is very easy to use and will automatically stitch together up to three images – this is especially impressive when combined with the ultra-wide-angle lens.

In operation, the v570 feels quick and responsive. You can zoom and pan around your shots with no noticeable delays and the shutter release is very quick. Wherever you are in the menu system, pressing the shutter button will take you back to capture mode.

The camera can also take good photos where many others would fail. You can use the flash even when shooting close up, while a warning alerts you when pictures may be blurred due to camera shake.

As you would expect from a camera of this size, some image noise is apparent, but overall the results are pretty impressive.

The v570 is an interesting camera, not least due to the double-lens system. It's also capable of taking decent 5megapixel shots. *Paul Monckton*

## Details

**Price** £269.99  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Kodak [www.kodak.co.uk](http://www.kodak.co.uk)  
**Specifications** 5megapixel • 1/2.5in CCD • Dual lenses: 23-117mm range (35mm equivalent) • 5x optical zoom • 2.5in LCD monitor • ISO 64-800 • Live histogram • Panorama mode • 22 scene modes • Video mode (640 x 480, 30fps) with audio • USB dock • MMC/SD card compatible (32MB included) • Li-ion battery • 101 x 20 x 49mm (w x d x h) • 125g

## Verdict

**Pros** Two lenses; ultra-wide angle; build quality  
**Cons** No advanced manual modes  
**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★  
**Overall** A compact, capable and desirable camera that produces good results  
 ★★★★★

NETWORK STORAGE

# Plextor PX-EH40L

A high-capacity network-attached storage device with a wealth of features



**I**f you're looking for an external hard drive that can do more than simply store data, Plextor's latest network-attached storage (Nas) device, the PX-EH40L, will be of interest.

A Nas device is a hard drive with an Ethernet port that can be hooked up to a router, making the drive accessible from any PC on your network at all times.

Setting up the hardware is easy. The drive comes with a lengthy flat Ethernet cable and all you do is hook it up to your router.

The 400GB PX-EH40L looks rather elongated and is designed to sit upright, not on its side.

The software interface, which is accessed via a web browser, isn't particularly intuitive. When accessing the Administrator section, you're presented with a hefty list of options down the left side of the screen and very little guidance about what everything does. Experienced Nas users will probably be able to breeze through the options, but novice to intermediate users may well come unstuck. Plextor would do well to completely revamp the interface and give it a much more user-friendly feel.

We can't fault the PX-EH40L in terms of features. Two USB2 sockets at the rear allow external hard drives to be attached. You can also connect a USB printer and run the PX-EH40L as a print server. Should you want to access your files from afar, an FTP server can be set up. You can also do regular backups.

Up to 90 user accounts can be set up, complete with passwords, and shared folders assigned.

If Plextor wants the PX-EH40L to be used by the mass market, it will need to redesign the interface, but there's still a lot to like about this high-capacity Nas device. It's not cheap, but if you want to spend a little less, a 250GB version costs £249. *Will Stapley*

## Details

**Price** £369  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Plextor [www.plextor-europe.com](http://www.plextor-europe.com)  
**Specifications** 400GB 7,200rpm hard drive • Ethernet port • 2 USB2 ports • 8MB buffer • 8.2ms average seek time • Windows 98/ME/2000/XP • 42 x 265 x 131mm (w x d x h) • 1.3kg

## Verdict

**Pros** Print server; FTP; large capacity  
**Cons** Fiddly and unintuitive interface  
**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★  
**Overall** Plenty of features and a sizeable storage capacity, but Plextor should pay more attention to usability  
 ★★★★★

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## MULTIFUNCTION DEVICE

## Brother MFC-820CW

Fully featured, and comes complete with wireless networking



For the number of features it contains, Brother's MFC-820CW is deceptively small. It has the standard functions (print, scan and copy) as well as being able to fax but, unusually for a multifunction device (MFD), it comes in a sleek and slim box.

In keeping with the svelte image, the paper tray doesn't protrude from the front. Unlike similar models that have a linear paper path from top to front, this one feeds paper in from the front of the device, turning it inside and ejecting it back out from where it came.

Although the general build quality is good and consists of sturdy black and grey plastic, the extremely flimsy front paper tray lets it down somewhat.

Installation was simple, being just a case of picking up the scanner unit, which sits at the top of the device, and installing the four ink cartridges. This is also where the cable connections are located, for USB and Ethernet – the phone line, for faxing, connects to the left-hand side of the unit.

The MFC-820CW can also connect to wireless networks and supports both Wep and WPA security. The integrated card reader makes it possible to print pictures straight from a memory card, in tandem with the small colour LCD screen on the front of the device.

Scan quality is very impressive and colour prints and copies came out well, even on standard paper. Copying speeds are reasonable, taking around 15 seconds for a page of black and white text. This reduced to five seconds in draft mode. At the highest quality settings, it took one minute, 50 seconds to produce a copy that wasn't noticeably better than the standard version.

This MFD isn't going to be suitable for heavy-duty office use, particularly as the paper tray only takes 100 sheets, but as a general all-rounder it's pretty impressive.

Anthony Dhanendran

## Details

**Price** £245.58

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Brother 0870 60 60 626  
[www.brother.co.uk](http://www.brother.co.uk)

**Specifications** Four-colour inkjet  
• 1,200 x 1,200dpi print resolution:  
• 600 x 2,400dpi scan resolution  
• 20/15ppm mono/colour  
• 100-sheet paper capacity • USB2  
• Ethernet • Wifi • 14,400bps modem  
• Card reader: Smartmedia, Compact Flash, Memory Stick, SD, XD, MMC  
• Brother print software • 373 x 347 x 165mm (w x d x h) • 6kg

## Verdict

**Pros** Scan and print quality; features

**Cons** Not very fast; paper tray

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** For those who occasionally need a bit of everything, it's a good buy

★★★★★



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SURROUND-SOUND SPEAKERS

# Logitech Z-5450

Quality system with Dolby Digital decoder and wireless rear satellites



Setting up a home cinema can get incredibly expensive and it brings with it endless wires to clutter up your lounge. The Z-5450 5.1 surround-sound speakers from Logitech aim to reduce your wire count by operating its two rear speakers wirelessly.

Before we continue, it's worth pointing out that although these rear speakers don't need to be hooked up directly to the Z-5450's Control Center, they do both require power and will therefore need to be situated near power sockets.

The rear speakers use a Wifi connection to talk to the Z-5450's Control Center. In order to avoid conflicts with nearby 802.11g networks, the Control Center will hop channels on the 2.4GHz band if it detects interference. It's recommended you keep the rear speakers and Control Center no further than 8.5m apart.

We tested the speakers in a fairly cluttered wireless environment and suffered no signal problems.

Sound quality is very good. Each speaker outputs around 40w, with the large subwoofer thumping out 116w of bass. The Control Center decodes Dolby Digital and DTS signals and will upmix a standard stereo input.

The remote is a little disappointing. Logitech has tried to keep it simple, but it's easy to accidentally jam the rubbery buttons under the casing. It also struggled to operate when used at a distance of more than 3.5m.

The RRP of £349 is high, especially when Logitech's powerful standard wired Z-5500 system is £70 cheaper.

The rear wireless speakers won't suit all environments and many will be better off sticking with a standard wired surround-sound system. But for those who have plugs in the right place, the Z-5450 is a quality set 5.1 of speakers that won't disappoint. To hear more about this product, listen to our PCW Product of the Week podcast ([www.pcw.co.uk/podcasts](http://www.pcw.co.uk/podcasts)).

Will Stapley

## Details

**Price** £349

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Logitech  
[www.logitech.co.uk](http://www.logitech.co.uk)

**Specifications** 5 satellites (38-42w) • 1 subwoofer (116w) • 2.4GHz wireless rear speakers • Dolby Digital and DTS hardware decoder • 2 digital optical inputs • Digital coax input • 6-channel 3.5mm input • Stereo 3.5mm input • Headphone socket • Wireless remote

## Verdict

**Pros** Reduces wires; works alongside Wifi networks; performs well

**Cons** Powered rear speakers won't suit all environments; remote; price

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** This is a quality speaker system complete with a digital decoder

★★★★★

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## Gigabyte GC-PTV-TAF

**Price** £55.23 **Contact** [www.giga-byte.com](http://www.giga-byte.com) **Overall** ★★★★★

This dual-format analogue/digital PCI TV tuner and FM radio tuner supports all international broadcast standards: NTSC, Pal and Secam.

Included with the card are a T-style flexible wire FM aerial, a hi-gain 34cm stiff wire TV aerial, a splitter lead to convert a 3mm stereo jack into two RCA phono sockets, a USB infra-red sensor and a full-size remote.

Unlike the Terratec Cinergy 2400i DT (see [www.pcw.co.uk/2151148](http://www.pcw.co.uk/2151148)), this model only has a single tuner, so if you want to record two channels at the same time, you'll need to buy two cards.

You can read a more detailed review of this product at [www.pcw.co.uk/2152233](http://www.pcw.co.uk/2152233).

*Terry Relph-Knight*

**Overall** A well-featured TV tuner card at a good price

## Hawking HWU54DM

**Price** £35 **Contact** [www.hawkingtech.co.uk](http://www.hawkingtech.co.uk) **Overall** ★★★★★

This wireless adapter plugs into a USB socket or, using the supplied desktop stand, can be placed away from your PC. It incorporates a 5dBi (decibels relative to isotropic) antenna, which is still more than the average 2dBi employed by most wireless adapters.

A hinge on the USB plug means the adapter can be twisted to achieve the best wireless reception. The performance of the HWU54DM varied a great deal during our tests. If you can afford the extra, we'd recommend the better performing and more consistent HWU8DD (see [www.pcw.co.uk/2150669](http://www.pcw.co.uk/2150669)).

Read the full review at [www.pcw.co.uk/2151537](http://www.pcw.co.uk/2151537).

*Will Stapley*

**Overall** Similar in price to standard Wifi adapters, but suffered from inconsistent performance



## Terratec Aureon 7.1

**Price** £39.99 **Contact** [www.terratec.co.uk](http://www.terratec.co.uk) **Overall** ★★★★★

If you aren't already feeling sufficiently surrounded by 5.1 sound, this new 7.1 soundcard from Terratec might be for you. Audio is encoded on the fly into a Dolby Digital Live bitstream, which is then sent via a single optical cable to a suitable Dolby Digital-capable amplifier and set of speakers.

Six 3mm analogue jack sockets on the back panel offer an alternative to digital audio. Below these are S/PDIF format optical input and output Toslink sockets. A second back panel bracket carries a 15-pin connector for joystick/Midi use. Two four-pin sockets provide CD and auxiliary line inputs.

Read a full review at [www.pcw.co.uk/2152794](http://www.pcw.co.uk/2152794).

*Terry Relph-Knight*

**Overall** A well-specified 7.1 soundcard that doesn't cost a fortune

## Trendnet TEW-429UB

**Price** £35 **Contact** [www.philex.com](http://www.philex.com) **Overall** ★★★★★

The TEW-429UB combines a USB Wifi adapter with a built-in hotspot detector. Charged via the USB port, the adapter will seek out available wireless networks even when disconnected from your notebook.

Along with the SSID, a small screen tells you which channel each network is on, whether it's encrypted and the signal strength. Both WEP and WPA security profiles are supported as are the 802.11b/g Wifi standards.

It's larger than most USB adapters and costs a little more, but the TEW-429UB will suit those who want to avoid firing up their notebook only to find there are no available wireless networks.

Go to [www.pcw.co.uk/2151942](http://www.pcw.co.uk/2151942) for the full review.

*Will Stapley*

**Overall** Good way to find hotspots without turning on a notebook



YYePG Proudly Presents, Thx for Support



## Enermax Laureate EB305C

**Price** £29.50 **Contact** [www.enermax.co.uk](http://www.enermax.co.uk) **Overall** ★★★★★

The Enermax Laureate Enclosure is aimed at anyone who wants to back up important documents and files to an external drive, but either wants to cut the cost of buying a pre-built unit or has a spare 3.5in hard disk.

It can be attached via USB to either a PC or Mac and a manual explains the whole process, from dismantling the enclosure to formatting the disk. The device can take either an IDE or Serial ATA hard disk, and Enermax has included the cables for both. We used a 250GB Sata drive, and the hard disk's installation was quick and simple. Despite the case not housing a single fan, drives up to 10,000rpm are supported.

Read the full review at [www.pcw.co.uk/2152850](http://www.pcw.co.uk/2152850)

*Rob Jones*

**Overall** Back up data without buying a pre-built external unit

## Hitachi 7K100

**Price** £175 **Contact** [www.hitachi.co.uk](http://www.hitachi.co.uk) **Overall** ★★★★★

Although this drive doesn't use perpendicular recording, it's still a blazingly fast 2.5in model. Available in capacities from 60GB to 100GB in both ATA and Serial-ATA 1.5Gbytes/sec interfaces, the Travelstar series features 7,200rpm spin speeds, an 8MB cache and a seek time of 10ms.

The 100GB capacity of the 7K100 model reviewed here is achieved by using two platters with a density of 81Gbits per square inch.

For those who want to upgrade the slow, low-capacity drive in their notebook, the new Travelstar range from Hitachi would be a good choice. It is, however, one of the more expensive notebook drives.

Read the full review at [www.pcw.co.uk/2151496](http://www.pcw.co.uk/2151496).

*Simon Crisp*

**Overall** If you don't mind the price, this is a super-fast notebook drive



## Nvidia GeForce 7900GT

**Price** £257-£280 **Contact** [www.nvidia.com](http://www.nvidia.com) **Overall** ★★★★★

This graphics card comes in two flavours, the high-end GTX and the GT. The 7900GT, reviewed here, is built on the same 90nm architecture as the faster 7900GTX, but has half the memory (256MB) and slower clock speeds – 450MHz core and 660MHz memory (1,320MHz effective).

In 3Dmark05 the 7900 clocked up a score of 7,666. This beats most standard 7800GTX cards and, as ever, can be linked up in an SLI configuration to provide even faster performance.

The 7900GT's closest ATI competitor in terms of price is the Radeon X1800 XL. In our benchmarks, it outperformed ATI's effort, though not by a huge amount. Read the full review at [www.pcw.co.uk/2151683](http://www.pcw.co.uk/2151683).

**Overall** A good value-for-money card with decent performance

## Passive HFX Silent Case Kit

**Price** £299 **Contact** [www.passivetechologies.com](http://www.passivetechologies.com) **Overall** ★★★★★

We've seen some interesting looking cases in the PCW Labs, but none quite as bizarre, nor indeed as heavy, as the HFX Silent Case Kit.

The name gives an indication that it's a quiet PC and, thanks to a grand total of zero fans, the only thing you're likely to hear is the hard disk or DVD drive whirring away.

The HFX case does away with conventional cooling due to the two extra-large heatsinks sitting on either side of the case.

A variety of heatpipes are included and allow you to hook up the likes of the processor and graphics card to the massive heatsinks.

Read a full review at [www.pcw.co.uk/2151886](http://www.pcw.co.uk/2151886).

*Will Stapley*

**Overall** An interesting fanless case for a home theatre PC



YYePG Proudly Presents, Thx for Support

**MOBILE INTERNET**

# Onspeed Mobile



Boost your mobile's web capabilities and save money on your phone bill at the same time



Left: Onspeed Mobile will reformat web pages so they're legible on small displays

Above: Entering web addresses is simple

**O**nspeed, the company that promises to boost dial-up and broadband Internet connections using its compression technology, has now turned its attention to the countless frustrated mobile Internet users who are struggling to access websites via their phones.

Onspeed Mobile follows the same premise as the original Onspeed service. When you request a website via the browser, it's sent directly to Onspeed's servers where it is compressed and passed back to your phone.

The application is less than 100KB in size and installation is painless. Once you've registered, all access to the Internet is performed using the Onspeed Mobile browser.

The end result is a dramatic increase in speed. Using a Nokia N70 with a 3G connection we had to wait just over one minute for the full PCW website to appear, which involved downloading 305KB of data. With Onspeed, this was reduced to around 15 seconds and a data transfer of just 44KB.

Images look a lot more compressed using Onspeed Mobile, but we suspect most mobile Internet users will be happy to sacrifice image quality for an increase in download speeds.

Using what is called MSR (mobile screen reformatting), Onspeed Mobile will also detect what phone you're using and reformat web pages on the fly so they're legible even on small displays. Sadly, a landscape view option is not available.

Many sites (including [www.pcw.co.uk](http://www.pcw.co.uk)) include long category lists that would normally sit down the left side of the page. Using a standard browser means you have to scroll through these before

reaching the main content. However, thanks to the Go To Text option in the settings menu, Onspeed Mobile can be set to skip past these lists and go straight to the first bulk section of text.

Page Up/Down commands and the ability to turn images on or off or select a smaller font are also available.

The service can't handle elements such as Flash movies, so sites that make heavy use of these will cause Onspeed Mobile a fair amount of trouble.

How well the reformatted page appears also varies depending on each individual website, but there's no doubt you have a far better chance of being able to read what's on a website with Onspeed Mobile than with most other standard browsers.

Onspeed makes it clear that all access to the Internet via Onspeed Mobile isn't secure – it's therefore not a good idea to use your credit card on sites accessed via the browser. Similarly, Internet banking is not recommended.

The service is compatible with most Java-enabled phones – Onspeed provides a complete list of compatible devices. It will also work with any type of Internet connection (GSM, GPRS and so on).

It's a subscription-based service, but at just £19.99 per year it's really not that expensive. If you're frequently accessing the Internet on your phone, you may well find that you save a fair amount of money due to the decrease in data downloads.

In short, Onspeed Mobile works extremely well. It has limitations, such as its insecure nature, but if you're frequently using your mobile to access websites it's well worth giving the 14-day free trial a go.

*Will Stapley*

YYePG Proudly Presents, Thx for Support

## Details

**Price** £19.99 per year

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Onspeed  
[www.onspeed.com](http://www.onspeed.com)

**System requirements** Java-compatible phone • GSM, GPRS, 3G, UMTS, Wifi connection  
• 100KB of free space

## Verdict

**Pros** Increase in speed; pages automatically reformatted; cheap  
**Cons** Insecure connection; has trouble reformatting some sites; no landscape mode

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** A great way to bring the world wide web to your mobile phone

★★★★★



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Telephone: 01636 700496  
E-mail: sales@avguk.com

## ANTI-VIRUS

## AVG Free for Linux

Don't assume you're safe from viruses just because you're not using Windows



Although the popular assumption is that Linux is immune to viruses, you're still at risk – especially if you share files with Windows users.

AVG Free for Linux is available to download for home and non-commercial users. Individual installation files are available specifically for Mandrake 10 and higher (now renamed Mandriva), Red Hat Enterprise Linux 4 and higher, all versions of the Fedora Core and Suse Linux 9.1 and higher distributions. This is not to say they won't work on other distributions, but it's a matter of trial and error.

Installation on a PC running Mandriva 2005 Limited Edition was simple. Unfortunately, despite what the

manual claimed, there was no icon created in the KDE (K Desktop Environment) or Gnome menus. However, the manual did explain where the files could be found, and apart from this discrepancy the manual is excellent.

AVG Free for Linux can be run entirely from the command prompt, but there is a graphical front end as well. Using the command line offers some extras such as creating a report file. Updates are easy to apply and can be scheduled.

Realtime protection is available, but as it involves recompiling the kernel it is best left to the more experienced Linux user.

Scanning was commendably quick; a home folder of around 430MB was scanned in one minute, 30 seconds. Another Linux anti-virus utility, ClamAV, which is command-line based and harder to use, scanned the same folder in four minutes, 15 seconds and reported to have scanned nearly 1,000 files more than AVG. However, unlike AVG, ClamAV also scans emails. A fix can be found at <http://tinyurl.com/lnazo>, but this is a workaround.

The threat of viruses to Linux is fairly low at the moment, but it won't stay this way forever. AVG Free for Linux is easy to use, won't cost you a penny and is therefore well worth trying out. *Tim Smith*



## Details

**Price** Free

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** AVG <http://grisoft.com>

**System requirements** Any Linux distribution

## Verdict

**Pros** Fast scanning; excellent manual; good interface

**Cons** Realtime scanning requires tweaking

**Features**

★★★★★

**Ease of use**

★★★★★

**Value for money**

★★★★★

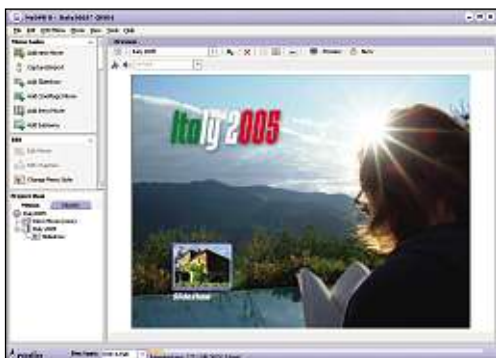
**Overall** An easy-to-use anti-virus utility that's well suited to new Linux converts

★★★★★

## DVD AUTHORIZING

## Roxio MyDVD Premier

A well-featured DVD-authoring suite for beginners and experienced users alike



There once was a time when video-editing software and DVD-authoring programs were separate entities. But now, most video-editing applications include an output to DVD option and, as in the case of Roxio's MyDVD Premier, many disc creation apps include full video-capture and editing facilities.

This is not necessarily a bad thing. With MyDVD, it means that everything users need to produce high-quality DVD movies or photo slideshows from their own camcorder footage and digital image libraries is housed under one roof.

There are two basic ways to use MyDVD. More experienced users can get fairly hands-on by starting the application in standard mode. This provides access to all MyDVD's tools and features, including full timeline video editing and a useful hierarchical project preview that presents the disc's menus and chapters in a tree view.

Click on 'Quick DVD Creation' from the splash screen and MyDVD will launch in Express mode. Here, many of the more technical aspects of video disc creation become automated. Cinemagic, for example, can edit together a complete movie from raw footage in minutes. And when it comes to building the DVD, wizards guide you through most of the process, and pre-designed templates help create menus.

Producing discs using the assistant-driven Express mode is a less creative experience, but it's a simple way to get footage from tape to disc without the hassle.

Other interesting features include a useful media manager and UPnP server for sharing media around a network. It also features support for high-definition video formats, although since burning HD to disc is currently limited to DivX HD-compatible DVD players in the UK, this is of less interest than it sounds.

It's not the cheapest of packages, but it will appeal to beginners and more experienced users. *Jonathan Parkyn*  
YYePG Proudly Presents, Thx for Support



## Details

**Price** £49.99

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Roxio [www.roxio.co.uk](http://www.roxio.co.uk)

**System requirements**

1.6GHz Pentium 4 • 256MB Ram  
• 1GB hard disk • DVD/CD writer  
• Windows 2000/XP

## Verdict

**Pros** Easy to use; Dolby Digital support; widescreen mode; UPnP

**Cons** HD output supported by DivX-compatible players only; not the cheapest option

**Features**

★★★★★

**Ease of use**

★★★★★

**Value for money**

★★★★★

**Overall** MyDVD Premier might be a little expensive, but has a great deal to offer digital home-movie makers of all experience levels

★★★★★



UTILITY SUITE

# Iolo System Mechanic 6

A wide range of useful tools to keep your PC in tip-top condition



Iolo's System Mechanic 6 is a comprehensive suite of tools designed to keep your PC running efficiently and safe from Internet nasties such as spyware.

This latest version has an updated user interface that's easier to operate and offers more features and flexibility than previous editions.

Iolo touts a total of 13 new or improved features in version 6, including a high-speed disk defragmenter, full disaster recovery, startup manager and one-click Power Tools that run through selected common procedures with just a single click.

System Mechanic Professional's new dashboard interface gives you automated, wizard-driven tools that analyse and rate your system's health, finding problems and giving you the option of fixing them. This analysis covers six main areas – Clutter, Speed, Safety, Fitness, Update and Active Care. Each of these is rated with a traffic light indicator that shows you where your PC may require attention. Clicking on any of the indicators provides more information on what has been discovered.

A huge array of individual, single-purpose tools is also provided, enabling you to perform tasks such as increasing your Internet and hard-drive speed, sorting out your Windows startup items, recovering lost data and managing system memory. It also provides secure deletion of unwanted data as well as a grab bag of system customisation tools. In fact there are so many tools, it would be easy to become lost among them were it not for System Mechanic 6 Professional's fully integrated and rather well thought-out user interface.

A Windows help file is provided that covers most aspects of operation, but a proper user guide would have been welcome, and we felt some of the automated tools didn't provide quite enough detail on the changes they would make to our system. On the whole, though, this is a decent utility suite.

*Paul Monckton*

## Details

**Price** \$69.95 (approx £40)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Iolo [www.iolo.com](http://www.iolo.com)  
**System requirements**  
 128MB of Ram • 60MB hard disk  
 • Windows 98/2000/2003/XP

## Verdict

**Pros** Huge array of tools; easy to use  
**Cons** Inadequate documentation

**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

**Overall** A very powerful suite of Windows tools that aid in the maintenance, protection and recovery of your system  
 ★★★★★★

ONLINE SECURITY

# Avanquest Ghostsurf Platinum: Identity Protector

If you're nervous about going online, this utility covers tracks and protects sensitive data



Ghostsurf Platinum: Identity Protector from Avanquest is a collection of utilities to protect personal information while surfing the web.

Installation is straightforward. The setup wizard covers all the important information and gives the new proxy settings for accessing the Internet. Settings for Internet Explorer are changed automatically, but other browsers may need manual tweaking. Using these proxy settings, all traffic is routed through the Tenebril servers for anonymous surfing.

The Privacy Control Center provides access to the various tools and also houses a simple slider for

switching between the different levels of security. When slid all the way to Secure, all personal information is blocked and all information is encrypted.

You can call up a list of all traffic that has passed through the computer. This doesn't just include web browsing, but traffic such as programs that are constantly checking for updates. It is also possible to exclude sites from the privacy settings to make sure they still work.

Protection from spyware is handled by Spycatcher. This has a good process for identifying the source of the warning, making sure that an installation program is not stopped erroneously. Read a full review of Spycatcher at [www.pcw.co.uk/2143465](http://www.pcw.co.uk/2143465).

Pop-up advertising is stopped by Adarmor. During testing, this made a noticeable difference to browsing, but some sneaky pop-ups managed to squeeze through.

Finally, TracksCleaner can securely delete files on the computer using a variety of techniques. A quick delete option is available, but the Gutmann's Algorithm option, which overwrites the data 35 times, is more secure.

Recently opened file lists can also be imported for deletion and regular cleanups scheduled.

Ghostsurf does exactly what it intends to but, while some tools are handy, we doubt the majority of surfers require the advanced privacy controls.

*Tim Smith*

YYePG Proudly Presents, Thx for Support

## Details

**Price** £19.99  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Avanquest 01752 895 100  
[www.avanquest.co.uk](http://www.avanquest.co.uk)  
**System requirements** Pentium  
 350MHz • 64MB of Ram • 16MB  
 disk space • Windows 2000/XP

## Verdict

**Pros** Very good at removing tracks; stops spyware  
**Cons** Overkill for most users

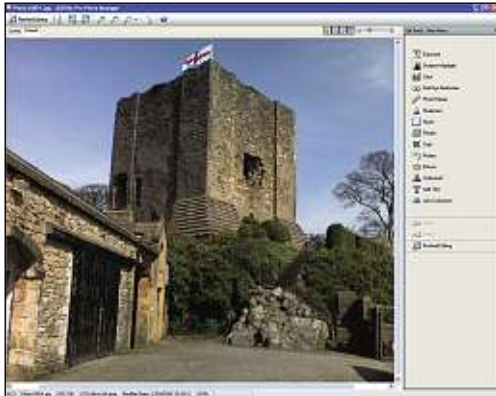
**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

**Overall** Covers all elements of hiding web activity, but it's only for the ultra-paranoid  
 ★★★★★★

## IMAGE EDITING/ORGANISING

# ACDsee Pro Photo Manager

A good-value package to organise, sort and edit your digital photos



**A**CDsee started out as a shareware jpeg decoder/viewer, bundled with Mosaic in the mid-1990s. According to the manufacturers, this incarnation is aimed at professional photographers and advanced amateurs. Users can control the entire photo-editing process, from cataloging to publishing and archiving. What's more, it claims to do this faster than any competitor.

ACDsee Pro processes Raw files non-destructively, pretty much as effectively as Adobe Photoshop's

Camera Raw tool but for a fraction of the price. The latest version also recognises most strains of Adobe's public Raw format – Digital Negative (DNG).

Batching is even better. It now supports Raw files, as many as 10 edits and can even set metadata information. The professional emphasis is underscored by support for ICC and ICM colour profiles.

ACDsee Pro's interface is relatively cluttered and could even be described as clunky when compared with its competitors, but it's highly functional. And although wizards are always useful, ACDsee seems to have gone a little overboard with them.

It's loaded with organisational features (filters, sorts, categories/ratings and detailed searches) and includes an inbuilt calendar. You can customise your browser layout, then save the result as a workspace for later retrieval.

Numerous keyboard shortcuts are provided as standard, but you can change these or create your own. You can also tag photos visually – useful for sorting.

ACDsee Pro retains its own photo editor, providing access to tools that, while they're not in Photoshop's league, are still wide ranging.

Quick and easy to use, ACDsee Pro Photo Manager remains the most complete Windows workflow software for professional photographers. *Stephen Copestake*



## Details

**Price** €99.99 (£68 approx)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** ACDsystems  
[www.acdsystems.com](http://www.acdsystems.com)

**System requirements** Pentium III or higher • 256MB of Ram • 100MB hard disk • Windows 2000/XP

## Verdict

**Pros** Plenty of power; excellent batch processing; good price

**Cons** Clunky interface; too many wizards

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** A comprehensive tool for sorting large collections of photos

★★★★★

## VIDEO-CONVERSION

# Intervideo Ivideo to go

Convert files and DVDs and send them to your Ipod



Intervideo's Ivideo to go for Ipod tenders a simple enough notion; convert a file or DVD into a format that a video Ipod can read – either mp4 or H.264.

The software will automatically choose the best mp4 or H.264 output settings for the video, although this can be manually changed by selecting one of six profiles, each of which have varying frame rates, audio bit-rates and resolutions. A maximum output file size can also be configured for each file.

Unlike similar applications, Ivideo to go supports an impressive range of file formats from which to convert,

including Quicktime, 3GP and wmv. These are input formats – the program will only output mp4 or H.264.

It also converts DivX. However, we had to download the DivX codec separately for it to recognise the file. Of course, it won't encode copy-protected DVDs or DRM-encrypted video.

Converting video is never a very fast process, and our 42-minute test DivX file took the same time again to be turned into the mp4 format. Outputting in H.264 format took over twice as long, at 90 minutes. What's more, our file (a widescreen TV show) was squashed into a 4:3 aspect ratio to fit on the Ipod's square screen.

There's no denying the amount of compression (360MB reduced by 55 per cent in mp4 and 75 per cent in H.264), but video quality was better in mp4 format. There was discernable pixellation and frame dropping, but nothing as severe as when viewing the H.264 files.

Ivideo to go is the most versatile Ipod conversion software we've seen, but it does take a long time to convert files. Its saving grace is that it can batch convert, so you can leave the process running overnight and transfer the video in the morning. Plus, it's only £20.

However, until Apple starts to offer a US-style iTunes video service in the UK, the Ipod's video abilities will always be held back. *Luke Peters*

## Details

**Price** £20

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Intervideo  
[www.intervideo.com](http://www.intervideo.com)

**System requirements** Intel PIII 600MHz • 128MB of Ram • 50MB hard disk • Windows 2000/XP

## Verdict

**Pros** Wide-format compatibility; good compression; batch conversions

**Cons** Long encoding times; widescreen is squashed into a 4:3 ratio

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** At £20 it's a versatile video-conversion tool, but be prepared to wait for the results

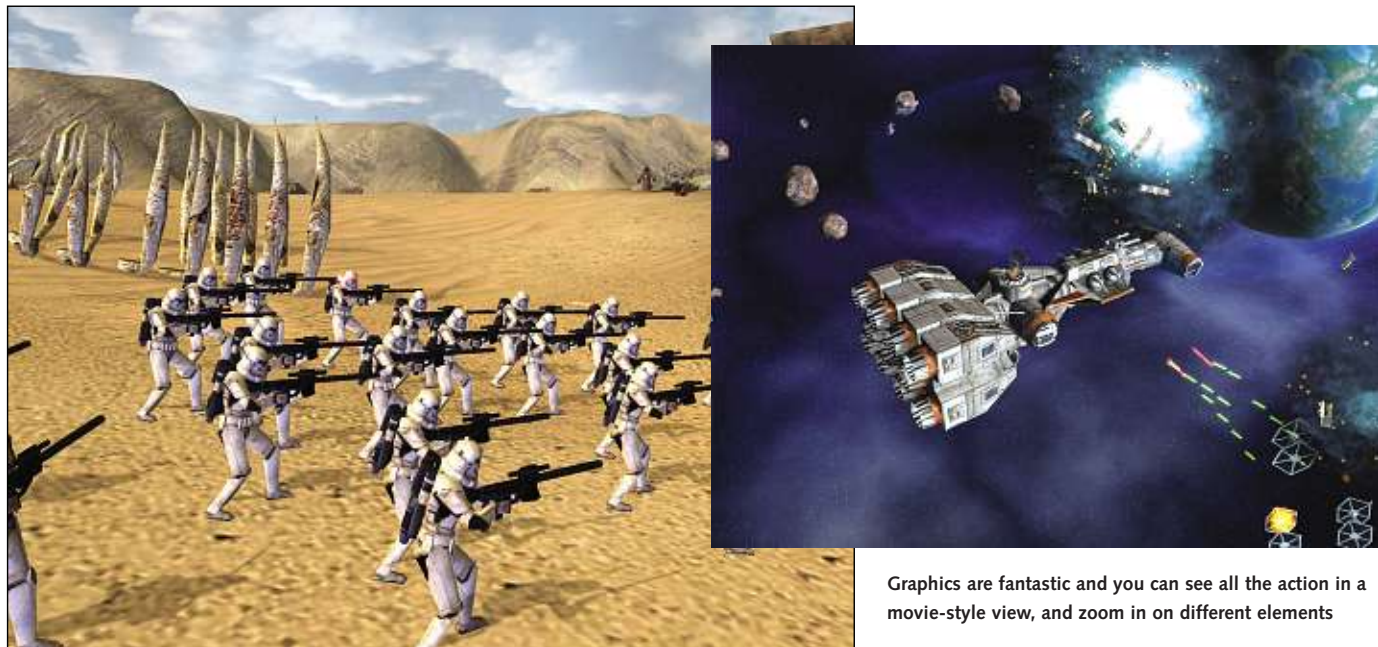
★★★★★

YYePG Proudly Presents, Thx for Support

## REALTIME STRATEGY

# Star Wars: Empire at War

Lead the Rebel Alliance or strike back as the Empire for control of the galaxy



Graphics are fantastic and you can see all the action in a movie-style view, and zoom in on different elements

Let's face it; *Star Wars* basically boils down to big battles between good and evil, which is probably why the most successful video games based on the series tend to focus on the epic combat element.

But while the *Battlefront* series has got the action end of the market sewn up, budding military tacticians have had a long wait for a decent *Star Wars* strategy game. Lucasarts has had several stabs at it, of which 2001's *Galactic Battlegrounds* (essentially a *Star Wars* themed version of *Age of Empires*) was probably the best of a bad bunch.

Set during the era of the original trilogy rather than the more recent prequels, *Empire at War* is the latest attempt to bring realtime strategy to the *Star Wars* universe. The game allows you to take on the role of either the evil Empire or the Rebel Alliance as you vie for control of the galaxy.

As with any strategy game, the idea is to win over more territory than your opponent through a series of strategic manoeuvres and tactical space and land battles. The game has several different modes, including a vast main Campaign, a series of shorter Galactic Conquest scenarios, instant-action Skirmish Battles and a Lan or online multiplayer mode with support for up to eight players.

The basic gameplay is pretty much the same in all cases. Build up your forces, send them to a new planet and try to take it over. If the planet in question is already occupied by the enemy, you'll have a bit of a fight on your hands – either in space above the world or on the ground itself.

If you play as the Empire, the game's theme is conquest, while as a Rebel, gameplay is skewed more towards 'liberation'. Choosing sides can also have a

fairly big impact on the way the game plays. As an Imperial commander, you'll have vast resources at your disposal from the offset and a brute-force approach can often pay off. If you choose to be an Alliance leader, you'll have to earn money the hard way and advance your technological status via less obvious means, such as espionage. As a Rebel, you'll see Imperial planets marked on the map, but as the Empire, Alliance-affiliated worlds will appear neutral until you investigate them and discover a Rebel presence.

There are definitely enough variations to warrant multiple plays through the game's main campaign as both factions.

Graphics, sound and overall presentation are spot on. All the familiar *Star Wars* noises and music help to create a suitable background atmosphere. With a good graphics card, the visuals are stunning. In the heat of a battle you can pull back to marvel at the scale of the carnage or zoom in to a single trooper to get a more personal perspective.

A special cinematic camera mode allows you to sit back and enjoy a movie-style view of the action. Just don't get too distracted by this or your forces could quickly become decimated. Also worth mentioning is the game's interface, which is more polished and intuitive than those found in many other strategy titles.

There isn't enough innovation here to excite strategy gaming stalwarts and the *Star Wars* theme occasionally feels a little crowbarred into the genre. But for those who grew up with the movie franchise, *Empire at War* is a bit like the adult version of acting out battles with your *Star Wars* figures and is probably, therefore, wish-fulfilment for a multitude of fans.

Jonathan Parkyn

YYePG Proudly Presents, Thx for Support

## Details

**Price** £39.99

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Lucasarts  
[www.lucasarts.com](http://www.lucasarts.com)

**System requirements** 1GHz processor • 256MB of Ram • 2.5GB hard disk • DVD-Rom drive • Windows 2000/XP

## Verdict

**Overall** Perhaps not the *Star Wars* game you are looking for, but fans will enjoy getting tactical in the galaxy far, far away



## THIRD-PERSON ACTION

## Majesco Advent Rising

Does Majesco's long-awaited advent rise to the occasion?



**F**rom its Half-Life-style logo to its overblown movie-like opening sequence (in which the scriptwriters get first credit) and widescreen presentation, you know that Advent Rising is intended to be a plot-driven sci-fi epic of cinematic proportions. In fact, the eagerly anticipated PC and Xbox third-person shooter never really lives up to the hype.

Story-wise, Advent Rising is a disappointing hodgepodge of everything from *Star Wars* to Halo. You find yourself in the flight boots of ace pilot Gideon Wyeth as he and his brother investigate the arrival of a mysterious alien ship.

The visitors turn out to be friendly but, before long, a new race of evil aliens bent on eliminating the human race has joined the party and all hell brakes loose.

As Gideon, you must run around shooting things in an effort to save your species from extermination.

To start with the action is pretty formulaic. The only thing to distinguish the game from legions of other sci-fi shooters during the early portion is its unusual targeting system that uses the mouse wheel to scroll through and select your enemies.

At a certain moment during the game your character will develop a range of cod-Jedi special powers. In fact, the game livens up considerably at this point and implementing your newfound talents can be pretty fun.

The main trouble with Advent Rising is that it's a bit bland. It wears its influences on its sleeve, but never even comes close to achieving the same greatness as the games and movies it apes.

Characters are two-dimensional, environments are featureless and samey, while the frequent scripted cut scenes are clumsy and, frankly, a bit embarrassing.

Combined with repetitive gameplay and little innovation, it's hard to care whether you reach the end of the game or not. *Jonathan Parkyn*

## Details

**Price** £29.99

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Majesco Entertainment  
[www.adventtrilogy.com](http://www.adventtrilogy.com)

**System requirements** 2GHz processor • 256MB of Ram • 5GB hard disk • DVD-Rom drive • Windows 2000/XP

## Verdict

**Overall** Advent Rising's big production values promise an ambitious sci-fi saga, but instead the game just comes across as a poor man's Halo



## RACING SIMULATOR

## Toca 3

Drive yourself to distraction with more motor sports than you can shake a gearstick at



**T**he Toca series of racing games has always been a bit of a rank outsider. Not as detailed as games such as Colin McRae Rally or as glamorous as some of its console rivals, such as Project Gotham Racing or Grand Turismo, Toca has nonetheless earned itself a reputation as a fun, realistic racing Sim with plenty of variety.

The franchise's sense of diversity reaches new, dizzy heights with the third game in the series. Toca 3 offers almost double the number of different race

types, licensed vehicles and real-world racing circuits as the previous version, which adds up to a whole lot of racing. With over 35 different motor sports covering everything from Formula 1 to go-cart racing over 120 championships, it's very hard to get bored with Toca 3, whether you're playing the Pro Career game or the World Tour game.

But if you're imagining that the game's wide scope results in some kind of throwaway arcade racing experience, you'd be very wrong. In fact, Toca takes the simulation angle fairly seriously. You won't have to faff around in a virtual garage tinkering with transmissions, as you're encouraged to do in some racing games. When it comes to the racing itself, Toca tries to remain as faithful as possible to each discipline, which means cars handle very differently and the assorted track types take a bit of getting used to. Damage, too, is a key element. Not only does it look spectacular, but crashing into opponents or scenery can have a big impact on how your car behaves.

The realism never gets in the way of the action, however, and the game has some very smart visuals. Occasional pre-rendered cut scenes involving your Scottish coach seem a little unnecessary, but help to pace the otherwise excellent action. *Jonathan Parkyn*

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## Details

**Price** £34.99

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Codemasters  
[www.codemasters.co.uk](http://www.codemasters.co.uk)

**System requirements** 1.4GHz processor • 256MB of Ram • 6GB hard disk • DVD-Rom drive • Windows XP

## Verdict

**Overall** Toca doesn't have the focus some other PC racers boast, but if it's variety you're after then look no further



# How we test

Performance testing is an important part of PCW's reviewing process and to obtain our authoritative results we use the UK's best PC testing resource – VNU Labs. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs.

One of the main reasons people upgrade their PCs is because their old model seems 'too slow'. But how do you tell whether the one you're going to replace it with is any faster? At PCW we take PC testing very seriously and we have the UK's best PC testing labs – VNU Labs – on tap to help us give you reliable, authoritative performance figures, to help you with your purchasing decisions.

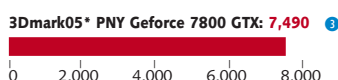
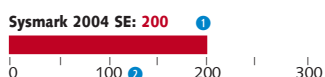
It's true that speed isn't everything, but it's an important part of the buying equation, especially when there are so many components out there. As many of our PC group tests are based on price bands, checking the performance is even more important – if the core system is underperforming, you need to know before you part with your hard-earned cash.

In VNU's UK Labs, which is part of the European VNU Labs network, our staff have over 20 years of combined testing experience. We know all the perils and pitfalls of practical benchmarking and we contribute to the development of industry-standard benchmarks through our full membership of Bapco ([www.bapco.com](http://www.bapco.com)), the non-profit benchmark consortium. We are also a media member of the Futuremark Benchmark Development Program ([www.futuremark.com](http://www.futuremark.com)). Listed below are the main benchmarks we use for testing PC systems and components.

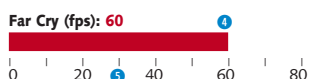
- Bapco Sysmark 2004 SE – an application-based benchmark that tests real-world system performance.
- Futuremark 3Dmark03 – a 3D graphics benchmark designed to test the performance of DirectX 8 graphics cards.
- Futuremark 3Dmark05 – the latest version of 3Dmark that tests DirectX 9 3D graphics performance.
- Ubisoft Far Cry – we use the Fort level timedemo to see how graphics cards perform in a real DirectX 9 game.
- Futuremark PCmark05 – a synthetic benchmark used to test the performance of a PC's major subsystems.
- Bapco Mobilemark 2005 – used to assess the battery life of notebooks using real-world applications and usage scenarios.
- Test beds – we use standardised AMD and Intel-based test rigs to test components and peripherals.

There's more information about our testing procedures and benchmarks on our Labs site at [www.reportlabs.com/testbed/bguides/benchmarks.php](http://www.reportlabs.com/testbed/bguides/benchmarks.php).

## Performance



\* tested at 1,024x768 in 32bit colour



- 1 A score of 200 indicates that the system is twice as fast as the reference PC
- 2 The reference PC (2GHz P4 512MB of Ram) scores 100
- 3 A Geforce 7800 GTX would score in the region of 7,490
- 4 A score of 60fps (frames per second) or higher is most desirable
- 5 A result of 30fps or above means the machine can produce playable frame rates at the tested resolution



3Dmark03 is used to test DirectX 7/8 graphics cards



PCmark05 measures memory, processor, graphics and hard drive performance



3Dmark05 pushes modern graphics cards to their limits

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Editor's Choice

**'We tracked down the most versatile and innovative media center PCs the industry could come up with - no expense spared'**



# Style challenge

**Fast PCs that don't look out of place in a high-tech living room have so far been hard to find, but Cliff Joseph has rounded up 10 media center PCs to see how well they fit the bill**

**C**onvergence has been a buzz word for so long now that many people barely pay it any attention. And yet the convergence of technologies is slowly taking place, as computers become more like video recorders, and film and television programmes become readily available over the Internet. To handle all the music and video content that's now flying around the world - either through the airwaves or the digital domain of the Internet - we need more than just an ordinary PC.

This is where the 'media PC' comes in. It's hard to define exactly what a media PC is - and the marketing drivel surrounding initiatives such as Intel's Viiv doesn't exactly help (see box on page 72 for more information on Viiv). However, we're now starting to see a new generation of PCs that look and operate more like a VCR or DVD recorder than a traditional PC. And these new PCs are designed to sit not on your desk, but in your living room, so that you can store all your music, video and games on a single machine.

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Of course, if you want a system to integrate into your existing audio-video (A/V) home entertainment setup, you're unlikely to want items such as a monitor or speakers. So we tracked down the most versatile and innovative media center PCs the industry could come up with - no expense spared. Some of the results were disappointing, for instance, one or two couldn't even manage a TV tuner, while others surprised us with the sheer variety of their capabilities. The good news is you can finally have both style and power in your living room. ↘



# Ambros Shuttle SD36G5M

Price £1,115 Contact [www.ambros.co.uk](http://www.ambros.co.uk)



**A**mbros specialises in small form factor PCs, so we weren't surprised to see that its latest entertainment system is built around a compact Shuttle chassis.

It may look like a fairly conventional compact PC system – in which case it will probably look better on a desk than sitting in your living room – but the SD36G5M is the first Shuttle case that is officially 'Viiv ready', which means that it provides the main

features required for a Viiv entertainment PC (see box on page 72).

Inside the case there's a 2.8GHz dual-core Pentium D, which should provide plenty of processing power for handling large audio and video files. There is 1GB of Ram and a good-sized 300GB hard disk that will be able to store many hours worth of audio and video material.

The ATI All-In-Wonder 2006 graphics card has a DVI interface as well as a built-in TV tuner, radio receiver and an adapter for connecting a Scart cable. Alongside this there's a second digital TV tuner card, so you can watch either ordinary analogue TV or the various Freeview digital channels. We were also pleased to see that the SD36G5M has a Firewire port to enable you to connect a DV camcorder and transfer your own home movies onto this Shuttle SD36G5M system.

ATI's All-In-Wonder cards sometimes trade a bit of graphics performance for their additional video features, but the SD36G5M performed well in all our tests (see page 69 for the full results), including 3D graphics, so it will perform equally well when running games and audio and video work. Ideally, we'd like to see a slightly more front-room-friendly design, but that's our only criticism of this well-priced and versatile entertainment PC.

## Verdict

**Pros** Very good all-round performance and versatile audio/video features

**Cons** Traditional PC design is more suited to the office than the living room

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A conventional design, but the SD36G5M provides all the power and features that you need from a multimedia PC

★★★★★

# Cube 247 Omega ST2

Price £1,499 Contact [www.cube247.com](http://www.cube247.com)



**L**ike Ambros, Cube has opted for a fairly conventional PC design for its system – albeit in a compact small form factor case. It won't look as stylish sitting next to your TV as the Fujitsu-Siemens Scaleo E or Hi-Grade DMS II 3200. On the other hand, it does make a great multimedia and games machine.

Equipped with a dual-core AMD64X2 4600+ processor, the Omega ST2 walks – or rather runs –

away with the top spot in the majority of our benchmark tests (see page 69 for the results). It will have absolutely no trouble handling any audio or video work that you want to throw at it, and the included Radeon X1800 graphics card produces top-notch 3D performance, so it's more than a match for even the most demanding 3D games.

Judged purely in terms of performance the Omega ST2 doesn't really have any competition here. However, there's more to an entertainment PC than raw performance, and the Omega can't quite match the multimedia features of some of its more versatile rivals in this group test. It's got the basics covered – the S-video output on the graphics card will allow you to connect it to your TV, and you also get surround sound and two digital audio inputs and outputs. There are also Firewire ports for connecting a DV camcorder, along with a media card reader for transferring files from a digital camera.

There's only a single TV tuner, though, and no composite or S-video input for recording video from other sources. So, while Cube's Omega ST2 is a terrific games machine or a workstation for video editing or music recording, there's no way it's ever going to be able to replace the VCR or DVD recording systems you currently use in your living room.

## Verdict

**Pros** Really strong performance for games and audio and video work

**Cons** Expensive; unattractive design

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**A top-notch multimedia PC – but one for the bedroom or office rather than the living room**

★★★★★

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# Dell Dimension 5150C

**Price** £909 **Contact** www.dell.co.uk



**D**ell's Dimension 5150C is probably the most conventional-looking PC in this group. Having said that, its silvery, slimline mini-tower design is quite compact and tidy, and it wouldn't look terribly out of place on the floor of your living room alongside a TV or hi-fi system.

However, it's not the most versatile entertainment system we've seen. The Dimension does have DVI and S-video outputs, so you can connect it to either a

computer monitor or TV set, along with 7.1 surround sound and digital audio input and output. But it also lacks some other features that would seem to be fairly basic for an entertainment PC. The most obvious omission is the lack of a TV tuner card, so you can forget about using the PC to record TV programmes. This is a rather strange omission for any system that is claimed to be a true Media Center PC.

Thankfully, the Dimension does have a Firewire interface that will allow you to grab your home movies from a DV camcorder, but we would like to see analogue video input as well, enabling you to transfer old video tapes to the machine's hard disk. Wireless networking would have been good too, especially if you want to put the Dimension in your living room.

The 5150C's performance results are something of a mixed bag. The 2.8GHz Pentium D processor performs very well and should have no trouble dealing even with complex audio and video projects. However, the PC's overall performance is slightly let down by the use of a low-cost Radeon X600 graphics card, which produces unremarkable performance for 3D games.

The overall impression is of a fairly conventional PC system that has some useful multimedia features, but which fails to match the more comprehensive capabilities of many of its rivals.

## Verdict

**Pros** Compact, slimline design at a competitive price

**Cons** No TV tuner and limited 3D performance

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A perfectly good PC for home or office use, but it lacks the versatility of some of the more advanced entertainment PCs here

★★★★★

# Elonex Artisan VX

**Price** £1,199 **Contact** www.elonex.com



**I**t may have an odd name, but the Artisan is one of the more neatly designed entertainment PCs in this group test. Like the Fujitsu-Siemens Scaleo, it looks more like a traditional consumer electronics device than a PC.

It's housed in a slim, matte-black case that won't look out of place next to your other A/V gear, and the simple row of buttons adorning its front panel make it look and feel just like a VCR.

However, there's a lot more going on round the back of the unit, which is bristling with audio and video connectors that will allow you to use the Artisan as the centrepiece of your home entertainment system. Like an ordinary PC, the Artisan has both VGA and DVI connectors that will allow you to connect it to a computer monitor. It also has an S-video output connector as well as adapters for Scart and composite video, so that you can connect it to most types of television set as well. The twin TV tuners mean you can record one programme while watching another, and there's even an FM tuner built in so that you can listen to the radio as well.

You can use the handheld remote control for simple tasks such as playing DVDs or listening to music, and a neat little wireless keyboard is included so that you can perform more complex tasks, such as browsing the web or sending emails, from the comfort of your sofa.

The Artisan isn't the fastest performer in this group, though. Its 2.8GHz Pentium D processor provides very good performance for audio and video work, but the Radeon X300 graphics card is a little below average for 3D games performance. Still, the attractive design and versatile audio and video features make it a good choice if you want to replace your existing music system or DVD recorder.

## Verdict

**Pros** Good performance; neat design and versatile audio and video capabilities

**Cons** A bit expensive, given the unremarkable 3D performance

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** An attractive entertainment PC that looks the part, although it's pricey and is not an exceptional performer

★★★★★

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# Evesham Ebox V

Price £999 Contact [www.evesham.co.uk](http://www.evesham.co.uk)



**E**vesham's Ebox V is one of the first entertainment PCs we've seen that displays the official Intel Viiv logo. So the first thing we wanted to find out was whether it genuinely offered the 'Instant on/off' feature that is part of the Viiv specification (see box on page 72). We were happy to see that this feature really did work, and we got a perverse delight from repeatedly turning the Ebox on and off and watching it start up instantly.

The design of the Ebox is a little odd. Its brushed-metal faceplate is neat enough, and there are headphone, microphone, USB and Firewire connectors all mounted on the front panel so that you can quickly connect a variety of audio and video devices to the unit. However, the overall impression is of a rather heavy piece of kit – and the presence of a very large heat-vent on the top of the unit with a big fan whirring away beneath it only adds to the impression that this is almost a piece of industrial machinery.

Aesthetics aside, the Ebox performs well in most areas – with one notable exception. Like a lot of the entertainment systems in this review there is a 2.8GHz Pentium D inside, which provides enough raw horsepower to cope with demanding audio and video files. Twin TV tuners will allow you to watch one programme while recording another and the Ebox supports both 5.1 and 7.1 surround sound.

The only disappointment was the use of an integrated Intel graphics chipset, which did let the Ebox down when it came to 3D graphics performance. So while the Ebox will work very well as part of your audio-video entertainment system, it probably won't keep the kids happy when it comes to playing games.

## Verdict

**Pros** Twin TV tuners; good performance for audio and video work

**Cons** Poor performance for 3D graphics and games

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A well-designed and versatile Viiv entertainment system, marred only by poor 3D performance

★★★★★

# Fujitsu-Siemens Scaleo E

Price £799 Contact [www.microanvika.co.uk](http://www.microanvika.co.uk)



**M**ost of these entertainment PCs are produced by traditional computer companies, such as Dell, Evesham and Elonex. Fujitsu-Siemens also has a background in the wider consumer electronics field and that experience shows in the design of its Scaleo E.

The PC looks just like an ordinary VCR or DVD player. An illuminated status display on the front panel tells you what is being recorded or played and there's

a simple row of buttons for controlling playback and recording. Beneath this there's a small flap that pulls down to reveal audio, composite video and S-video connectors, as well as headphone and microphone connectors. The only real indication that this is a PC is the set of Firewire and USB ports on this panel.

Around the back are twin TV tuners, two Scart connectors for hooking up the unit to your TV or other video devices, and multiple audio connectors for 7.1 surround sound and digital audio output. You also get DVI and VGA connectors for a computer monitor, and a set of additional Firewire, USB and Ethernet connectors.

The Scaleo really does have the A/V side of things very well covered. The only weakness is its games performance. The Pentium 4 processor with Hyperthreading is powerful enough, but the integrated graphics chip was by far the weakest performer in our 3D graphics tests. However, at just £799, the Scaleo is cheaper than all its rivals here and is comparable in price to a top-of-the-range DVD recorder. (A version with a better graphics card is due to be launched soon, but wasn't available in time for this review).

It may not be much of a games PC, but the Scaleo's VCR-style design will look at home in your living room, while its price makes it a realistic alternative to an ordinary DVD recorder.

YYePG Proudly Presents, Thx for Support



## Verdict

**Pros** Familiar VCR-style design and controls; versatile audio and video features

**Cons** Lacks graphics oomph for playing games

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** Games performance is disappointing, but the Scaleo's design and features make it a great system for those on a tight budget

★★★★★

# Hi-Grade DMS II 3200

**Price** £1,056 **Contact** www.higrade.com



Like the Fujitsu-Siemens Scaleo, the DMS II looks more like a DVD player than a traditional PC, so it will fit in well in the living room.

There's an illuminated status display on the front panel and a simple set of playback controls which makes it easy to play or record films, TV programmes or music. Beneath these controls is a flap that folds down to reveal a handy set of input connectors. There are composite and S-video connectors, stereo

audio, headphone and microphone, along with USB, Firewire and a memory card reader. They're all clearly labelled too, so it's very easy to connect camcorders, cameras and other devices.

You'll find even more options tucked away at the back of the unit – multiple audio and video inputs and outputs, two more Firewire ports, 7.1 surround sound and digital audio output, as well as both analogue and digital TV tuners. All the audio and video features you're likely to need are included, with the exception of a Scart connector for your TV. You can pick up a Scart adapter for just a few pounds, but it does seem strange that this was omitted in the first place.

The DMS II uses a Pentium 4 processor that can't quite match the performance of the dual-core Pentium D processors used by most of its rivals in this group test. Even so, a Pentium 4 running at 3.2GHz isn't exactly a slouch, so you'll have no problem with video recording or editing. The DMS II also provides much better graphics performance than Fujitsu-Siemens' Scaleo, thanks to its Nvidia Geforce 6600 graphics card and it can handle 3D games with ease.

That combination of all-round performance and audio and video features make the DMS II a really attractive addition to your home entertainment system.

## Verdict

**Pros** Attractive design; good performance; comprehensive audio and video features

**Cons** No Scart connectors; gets quite warm when running, so you probably can't stack it with other devices

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A powerful and versatile entertainment PC that will comfortably blend into your living room

★★★★★

# Mesh Cubex Media TV PCW

**Price** £1,144.83 **Contact** www.meshcomputers.com



The Cubex Media TV PCW won't win any prizes for style, but it's a very good all-round performer and multimedia system.

Like Ambros and Cube, Mesh has used a small form factor (SFF) chassis for the Cubex, so it looks very much like a conventional PC. It's also the largest of the three SFF systems in this review, so you'll probably have to think twice if you want it to fit in with your other A/V components.

Nonetheless, it provides all the main features you'd expect from a multimedia PC. The AMD Athlon64 X2 4400+ processor provides excellent performance – matched only by the more expensive 4600+ processor in Cube's Omega ST2. Graphics performance is very strong as well, thanks to the ATI All-in-Wonder X800GT. In overall performance terms the Cubex lags just behind its rivals from Panrix and Cube, but it's less expensive than either of those so it's a good choice if you're looking for a complete entertainment system that can handle music, video and games.

There's more to the Cubex than just raw power, though. The All-in-Wonder graphics card has both a TV tuner and radio receiver, as well as a special video output connector that can be used for either a Scart or S-video socket on a TV. With digital audio and surround sound, and Firewire for connecting a DV camcorder, this PC has all the main audio and video features you're likely to need. To top it all off the Cubex has a 400GB hard disk, so you'll be able to download music and films to your heart's content.

It's a shame the design of the Cubex is so conventional, as we can't imagine that many people will want something like this sitting in their living room. But its combination of price, performance and features make for a really strong multimedia PC that can handle music, video and games with ease.

## Verdict

**Pros** Powerful and well specified  
**Cons** Heavy and bulky, with an uninspired design

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A really strong multimedia PC, despite its unremarkable design

★★★★★

YYePG Proudly Presents, Thx for Support

# Panrix Mantis

Price £1,173.83 Contact [www.panrix.com](http://www.panrix.com)



Through no fault of Panrix, we had a little trouble running some of our benchmark tests on the Mantis, due mainly to the Raid 0 configuration of its twin 250GB hard disks. However, with an Athlon64 4000+ processor inside, it's safe to assume the system can handle office productivity software with ease. Besides, the test results we did get prove that the Mantis is no slouch and it will be able to handle any audio or

video work you throw at it. It also offers good games performance.

This PC is a little bulkier than we would have liked – even larger than Sony's Vaio VGX-XL 100 – and some people might simply think that it's too big for their living room. However, Panrix has certainly taken the opportunity to cram it full of useful features.

The twin hard disks provide vast amounts of room for large audio and video files, and the Raid system adds a little security as well. The Radeon X1600XT graphics card provides dual-DVI connectors and S-video output for connecting to a TV set. This is backed up by twin TV tuners and a Creative X-Fi Xtreme soundcard, which together provide all the audio and video inputs and outputs you're likely to need. There's Firewire as well, for connecting a DV camcorder and even wireless networking – a feature omitted by too many of these entertainment PCs. We would have liked to see a Scart connector as well, but that's not a major criticism.

The £1,173.83 price tag is certainly justified by the Mantis' performance and feature set. However, rivals such as the Sony Vaio VGX-XL 100 provide similar features and only slightly lower performance for around £1,000, so the Mantis doesn't quite come out on top for value for money.



## Verdict

**Pros** Strong performance; wide range of audio and video features

**Cons** Expensive; bulky; no Scart connectors

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** An entertainment PC with impressive features, although it's a little on the pricey side

★★★★★

# Sony Vaio VGX-XL 100

Price £1,021.99 Contact <http://shop.sonymstyle-europe.com>



Sony's background is primarily in consumer electronics, and has certainly made an effort to move as far away from conventional PC designs as possible with the Vaio VGX-XL 100.

The VGX-XL 100 doesn't even have a conventional VGA or DVI interface that will allow you to connect it to a computer monitor. What it does have – which will turn a few heads – is an HDMI connector that allows it to output a high-definition video signal. It also

supports component video output, which is great if you're a home cinema buff who already has a high-end or HD-Ready TV set – if not, you'll need to buy an adapter to use it with an ordinary TV or monitor. Looking to the future is fine, but a Scart connector for an ordinary TV set would have been useful.

As well as the HDMI connector, the VGX-XL 100 has composite and S-video inputs, as well as Firewire interfaces for connecting it to a DV camcorder or external storage. Analogue and digital audio inputs and outputs are included, as well as a 'hybrid' TV tuner that can pick up analogue or digital TV channels.

A 2.8GHz dual-core Pentium D enables the PC to handle digital audio and video recordings, and the Nvidia Geforce 6600 graphics chip provides pretty good 3D performance for games.

Our only real criticism – apart from the lack of Scart – is the XL-100's design, which is uncharacteristically cumbersome for Sony. The VGX-XL 100 is a bulky 430 x 400 x 129mm (w x d x h) and, to some eyes, lacks the style you normally associate with Sony products. To be fair, however, it's no bigger than a top-of-the-range A/V receiver and should sit neatly in a standard hi-fi rack. Even so, its high-definition support, strong performance and comprehensive array of audio and video features make this an almost future-proof entertainment PC.



## Verdict

**Pros** Good performance; HDMI video output; comprehensive audio and video features

**Cons** No Scart; bulky and cumbersome design

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** A truly powerful and forward-looking entertainment PC (shame about the size)

★★★★★

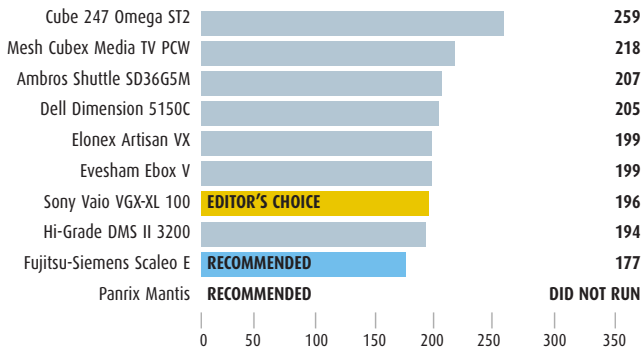
YYePG Proudly Presents, Thx for Support

# Lab results

There's a wide range of results, largely due to the variety of processors and chips on offer. Those systems with integrated graphics are the worst entrants overall

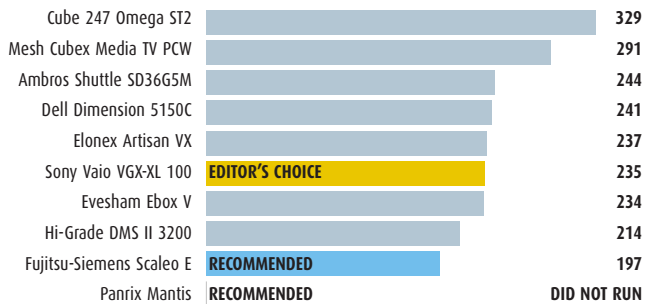
## Sysmark 2004 SE overall

Bigger is better



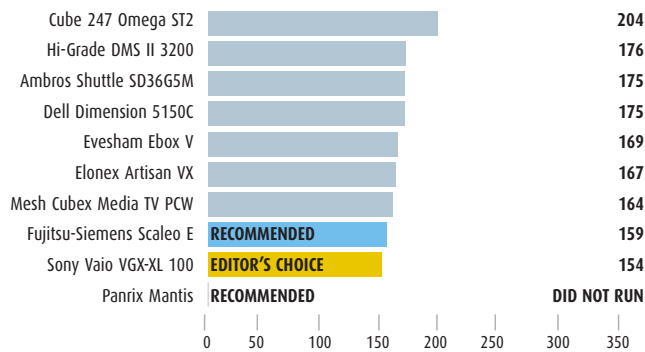
## Sysmark 2004 SE Internet content creation

Bigger is better



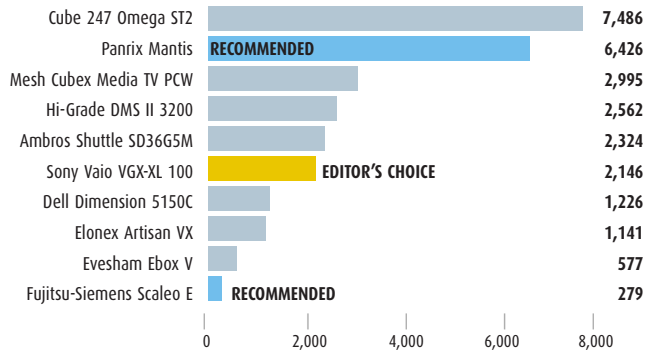
## Sysmark 2004 SE office productivity

Bigger is better



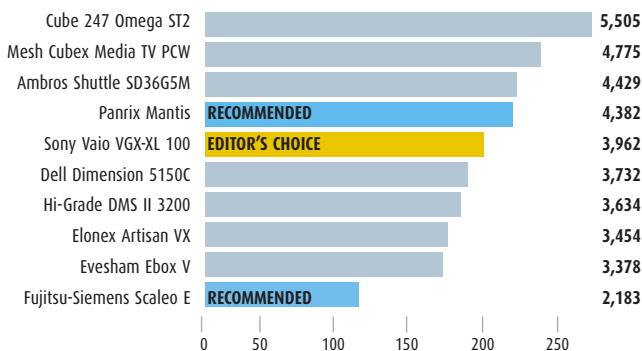
## 3Dmark05 (1,024 x 768 in 32bit colour)

Bigger is better



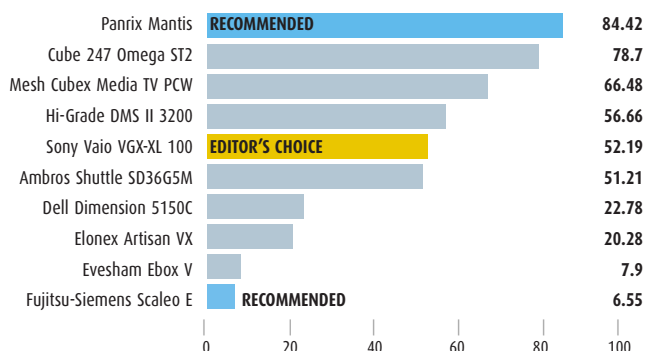
## PCmark05 overall

Bigger is better



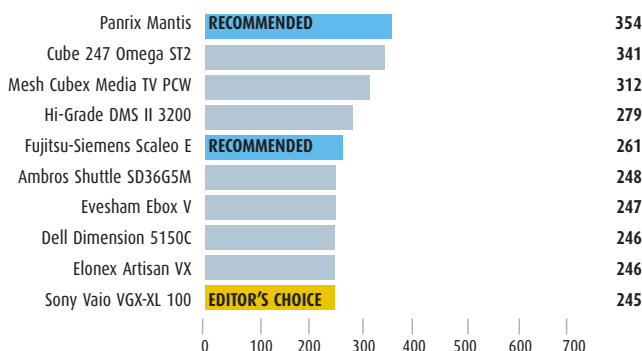
## Far Cry (1,024 x 768 in 32bit colour)

Bigger is better



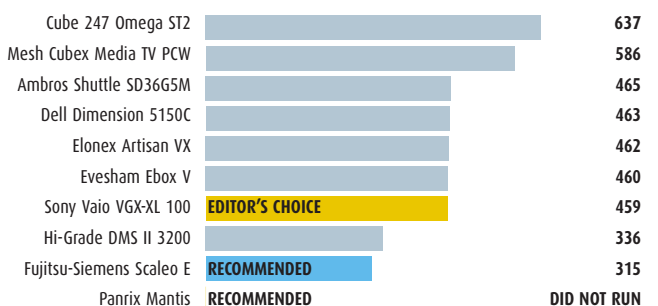
## Cinebench 1 CPU

Bigger is better



## Cinebench 2 CPUs

Bigger is better



Please see page 60 for an explanation of how we tested the PCs ↘

## Entertainment PCs

MANUFACTURER	AMBROS	CUBE 247	DELL	ELONEX
Model name	Shuttle SD36G5M	Omega ST2	Dimension 5150C	Artisan VX
Price (inc VAT & delivery)	£1,115	£1,499	£909	£1,199
Sales telephone	020 8998 1010	0870 242 1179	0870 152 4699	0870 780 1010
URL	www.ambros.co.uk	www.cube247.com	www.dell.co.uk	www.elonex.com
HARDWARE & I/O PORTS				
Processor	Intel Pentium D 920 (2.8GHz Dual Core)	AMD Athlon64 X2 4600+ (2.4GHz Dual Core)	Intel Pentium D 920 (2.8GHz Dual Core)	Intel Pentium D 820 (2.8GHz Dual Core)
Motherboard	Shuttle SD36G	Biostar	Dell OEM	Intel D945GPM
Chipset	Intel 945G	Nvidia Nforce4	Intel 945G	Intel 945G + ICH7DH
Available memory/type	1GB/PC2-533 DDR2	2GB/PC3200 DDR400	1GB/PC-2 4200 DDR2	1GB/PC-4300 DDR2
Occupied/spare memory slots	1/1	2/0	2/2	2/2
Max memory supported by motherboard	2GB	2GB	4GB	4GB
Hard disk manufacturer and model	Maxtor 6V300F0	2x Seagate (Raid 0)	Maxtor 7L250S0	Samsung Spinpoint SP2004C
Secondary hard drive	✗	✗	✗	✗
Total storage space	300GB	600GB	250GB	200GB
No of USB2/Firewire/serial/parallel/PS/2 ports	4/2/1/0/2	6/2/2/0/2	7/2/0/0/0	6/2/0/0/0
OPTICAL DRIVE(S)				
Primary optical drive	Pioneer DVR-110D	NEC ND-4570	NEC ND-6650A	Samsung TSH-552U
Optical drive formats and DVD write speed (max)	16x DVD, 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD -/+ R DL	16x DVD, 16x DVD+/-R, 8x DVD +RW, 6x DVD-RW, 8x DVD +R DL, 6x DVD -DL	8x DVD, 8x DVD -/+R, 8x DVD+RW, 6x DVD-RW	16x DVD, 16x DVD+/-R, 4x DVD -/+RW, 4x DVD -DL
Secondary optical drive	✗	✗	✗	✗
Optical drive formats and DVD write speed (max)	N/A	N/A	N/A	N/A
AUDIO				
Audio supported	7.1	7.1	7.1	7.1
Number of analogue/digital audio inputs & outputs	1/2/6/2	2/1/6/1	1/0/6/1	7/0/2/2
VIDEO				
Graphics chipset	ATI All-in-Wonder 2006	ATI Radeon X1800	ATI Radeon X600	ATI Radeon X300
Graphics output	VGA, DVI, Scart	DVI x 2	DVI	VGA, DVI
HD support (HDMI interface)	✓ (through DVI)	✗	✗	✗
Video inputs	S-video, Composite	S-video	0	S-video x2, Composite x2
Video output	S-video, Composite, Scart	0	S-video	S-video x1, Composite x1
TV tuner supplied	✓	✓	✗	✓ x 2
TV tuner make/type (analogue or digital)	ATI analogue & digital & Leadtek digital	Hauppauge WinTV 90002/digital	None	Hauppauge WinTV-HVR1300/dual digital
OTHER INFORMATION				
Other hardware supplied	Microsoft Media Center keyboard and mouse, Media Center remote control	Microsoft Wireless Comfort Keyboard and mouse, Media Center remote, 7-in-1 card reader	Dell Wireless Keyboard and Mouse, 13-in-1 card reader, V.92 modem	BTC 9019 Wireless keyboard and mouse, 8-in-1 card reader, Media Center 2005 remote control
Network	Gigabit Lan, 802.11b/g Wireless	Gigabit Lan	10/100 Lan	Gigabit Lan, 802.11b/g Wireless
Operating system	Windows Media Center Edition 2005	Windows Media Center Edition 2005	Windows Media Center Edition 2005	Windows Media Center Edition 2005
TV recording software	ATI & Media Center	MCE & PowerDVD	N/A	Sonic Encoders
Bundled software	Nero, Bullguard Internet Security (90 days)	PowerDVD, Nero 6	N/A	Phoenix Recovery Pro, McAfee 90-day trial
Standard warranty*	1yr RTB, 2yrs cost £69 extra	3yrs RTB	1yr RTB	3yrs C&R (next working day)
SCORES				
Features	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL				
	★★★★★	★★★★★	★★★★★	★★★★★

\* (RTB = Return to base; C&R = collect and return)

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	EVEESHAM	FUJITSU-SIEMENS	HI-GRADE	MESH	PANRIX	SONY
	Ebox V	Scaleo E	DMS II 3200	Cubex Media TV PCW	Mantis	Vaio VGX-XL 100
	£999	£799	£1,056	£1,144.83	£1,173.83	£1,021.99
	0870 160 9500	020 7467 6050	020 8532 6111	0870 046 4747	0870 027 1981	08705 424 424
	www.evesham.co.uk	www.microanvika.co.uk	www.higrade.com	www.meshcomputers.com	www.panrix.com	http://shop.sonymstyle-europe.com
	Intel Pentium D 920 (2.8GHz Dual Core)	Pentium 4 630HT (3GHz)	Pentium 4 640 (3.2GHz)	AMD Athlon64 X2 4400+ (2.2GHz Dual Core)	AMD Athlon64 4000+	Intel Pentium D 920 (2.8GHz Dual Core)
	Intel D945GPM	Fujitsu-Siemens P4M-915GD1-LF	Intel D915POM	Shuttle SN25P	Asus A8N-SLI	Asus Talas
	Intel 945G	Intel 915G	Intel 915P	Nvidia Nforce4	Nvidia Nforce4 SLI	Intel 945G
	504MB/PC-4300 DDR2	512MB/PC3200 DDR400	1GB/PC3200 DDR400	1GB/PC3200 DDR400	2GB/PC3200 DDR400	1GB/PC-4300 DDR2
	2/2	2/2	2/2	2/0	2/2	2/2
	4GB	4GB	4GB	2GB	4GB	4GB
	Western Digital WD250JS	Seagate ST3250823AS	Seagate ST3250823AS	Maxtor 6H400F0	2 x Samsung Spinpoint SP2504C (Raid 0)	Seagate ST3250823AS
	✗	✗	✗	✗	✗	✗
	250GB	250GB	250GB	400GB	500GB	250GB
	6/2/1/0/2	6/2/0/0/0	4/3/0/0/0	6/2/1/0/2	8/2/0/1/2	4/3/0/0/0
	Sony DW-Q78A	NEC ND-4551A	Lite-on SOHW-1673S	Sony DW-G120A	NEC ND-4551GNS	Mashita UJ-846D
	8x DVD, 8x DVD -/+R, 8x DVD+RW, 6x DVD-RW, 4x DVD -/+R DL	16x DVD, 16x DVD -/+R, 8x DVD+RW, 6x DVD-RW, 8x DVD +R DL, 6x DVD -RDL, 5x DVD-Ram	16x DVD, 16x DVD -/+R, 8x DVD+RW, 6x DVD-RW, 4x DVD +R DL	16x DVD, 16xDVD -/+R, 8x DVD+RW, 6x DVD-RW, 8x DVD +R DL, 4x DVD -RDL, 5x DVD-Ram	16x DVD, 16x DVD -/+R, 8x DVD+RW, 6x DVD-RW, 8x DVD +R DL, 6x DVD -RDL, 5x DVD-Ram	8x DVD, 8x DVD +/-R, 6x DVD +RW, 4x DVD -RW, 2.4x DVD DL
	✗	✗	✗	✗	✗	✗
	N/A	N/A	N/A	N/A	N/A	N/A
	7.1	7.1	7.1	7.1	7.1	5.1
	3/0/6/1	1/0/15/2	4/0/11/2	2/1/5/2	3/0/13/2	6/1/3/2
	Integrated Intel Express	Integrated Intel Express	Nvidia Geforce 6600	ATI All-in-Wonder X800GT/dual analogue	ATI Radeon X1600XT	Nvidia Geforce 6600
	VGA	VGA, DVI, Scart	VGA, DVI	DVI	DVI x 2	HDMI
	✗	✗	✗	✗	✗	✓
	S-video x2	Scart, S-video x3, Composite x3	Composite x3, S-video x4	0	Composite x2, S-video x2	Composite x2, S-video x2
	0	Scart	0	0	S-video	HDMI, PB Component
	✓ x 2	✓ x 2	✓ x 2	✓	✓	✓
	Hauppauge WinTV HVR-1100-L.P dual digital	Hauppauge WinTV/digital/analogue	Avermedia A169/dual analogue + Black Gold Signature/digital	ATI All-in-Wonder X800GT/dual analogue	Hauppauge WinTV-PVR 500 x 2/digital	Avermedia Hybrid A16C/digital
	Remote control	5-in-1 card reader, Fujitsu-Siemens RK0410 Wireless keyboard, Media Center 2005 remote control	7-in-1 card reader, infra-red keyboard with trackball	Logitech cordless rechargeable keyboard/mouse, Media Center remote, external 56K modem	Media Center keyboard, mouse and remote control	5-in-1 card reader
	Gigabit Lan	10/100 Lan	10/100 Lan, 802.11g Wireless	Gigabit Lan	Gigabit Lan x 2, 802.11b/g Wireless	Gigabit Lan, 802.11g/b Wireless
	Windows Media Center Edition 2005	Windows Media Center Edition 2005	Windows Media Center Edition 2005	Windows Media Center Edition 2005	Windows Media Center Edition 2005	Windows Media Center Edition 2005
	MCE 2005 roll up 2	MCE 2005	MCE 2005	MCE 2005	Win TV + MCE	MCE 2005
	PowerDVD 5.1 codec	Microsoft Works 8, Nero SmartSuite, WinDVD 5, Norton Internet Security 3-month trial	Open Office, Bullguard Antivirus (3 months), Sonic Recordnow	Microsoft Works 8.5, Cyberlink PowerDVD, Power2Go 4, Power Producer 3, Director 3, Mediashow SE, PowerDVD Copy, Power Cinema 4, 90-day E-trust Anti-virus	McAfee Internet Security, Ability Office	Sonic Stage 3.3, Premiere Elements 2, Photoshop Elements 4, Roxio Digital Media SE7, WinDVD 6
	2yrs on-site, 1yr RTB	1yr courier C&R	2yrs C&R	2yrs on-site, 1yr RTB	2yrs on-site, 1yr RTB	1yr RTB
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.



## Entertainment systems and Viiv

You may have seen some of Intel's recent adverts for Viiv, depicting happy families merrily gathered round a TV screen, watching films that they've downloaded from the Internet or streaming music around the house via their wireless network. Of course, any half-decent PC can do all these things already, so these ads don't really tell you anything particularly useful.

We recently attended a rather posh event that Intel held in London, graced by the likes of Jonathan Ross, Michael Owen and some bloke who used to be in New Order. We cornered one of Intel's product managers to ask: 'What exactly is Viiv?'

'It's a promise for the future,' came the well-rehearsed but utterly meaningless reply. Nonetheless, we persevered and eventually managed to pin down some sort of official definition of Viiv. In order for a PC system to carry the Viiv logo, it must be based on a dual-core Intel processor, such as the Intel Core Duo or Pentium D. That will give you the raw horsepower to compress and decompress large video files, including high-definition TV and video.

The PC's motherboard will be equipped with an Intel Express chipset, which will offer either 5.1 or 7.1 surround sound audio, and an 'instant on/off' feature, so the PC can be turned on straight away, just like an ordinary TV.

Somewhat oddly, a TV tuner isn't required for the Viiv seal of approval. That is a strange omission, since the whole point of Viiv seems to be to produce a single device that can act as your complete entertainment system, replacing the multiple boxes currently piling up in living rooms across the world. There's no mention of a remote control unit either so, like the TV tuner, this is merely an optional extra.

Of course, none of these features is unique to Intel, and you probably won't be surprised to know that Intel's arch-rival AMD is conducting its own equally vague branding exercise, called AMD Live. As far as we can tell, AMD Live is simply a logo that can be slapped onto any PC that has an AMD64 processor inside.

Where Intel might score over AMD is that it has been working with a number of content providers to create new services specifically designed for use with Viiv PCs. Companies such as Sky, Napster and MTV are producing versions of their existing services that are designed to be controlled via a TV set and remote control rather than

through a conventional computer monitor and keyboard. Even so, these services will still be available to ordinary PC users as well, so you won't be missing out just because you don't have an official Viiv PC.



## Editor's Choice

**Editor's Choice** Sony Vaio VGX-XL 100

**Recommended** Fujitsu-Siemens Scaleo E • Panrix Mantis



Sony Vaio VGX-XL 100



Fujitsu-Siemens Scaleo E



Panrix Mantis

price, which earns the Scaleo E a Recommended award, despite its poor 3D graphics performance.

Watch out for the new version of the Scaleo later this year which promises to have much better graphics performance and should be an outstanding entertainment PC.

Although the Panrix Mantis' Raid array flummoxed out benchmarks, this was not the fault of Panrix and its performance in the other tests was good. Its wide range of A/V features mean it deserves a Recommended award, although it was pipped at the post for Editor's Choice by the less expensive Sony Vaio VGX-XL 100.

The Vaio isn't perfect – we can't figure out why it doesn't have a Scart connector – but its support for high-definition video output effectively makes it much more future-proof than its rivals.

This year will finally see the launch of commercial HDTV broadcasts in the UK, so the Vaio's HD support puts it into a league of its own and ensures that you can plug it into the next generation of HD-ready TV sets. It also has a comprehensive set of audio and video features and solid 3D graphics performance. **PCW**

It's fascinating to note that all but three of the entertainment PCs submitted for this group test use Intel processors – perhaps Intel's Viiv marketing push is already starting to take effect. Whatever the reasons, the systems submitted for this review fell into two quite distinct camps.

There were a number of fairly conventional PC systems that provided useful multimedia features, such as TV tuners and audio and video capabilities, but which were still primarily designed to sit on a desk and be used with an ordinary computer keyboard and mouse.

In this subset, the Cube Omega ST2 was the outstanding product, simply because of

its sheer all-round performance. But with a price of almost £1,500, and a very conventional PC design, we couldn't really recommend it as an entertainment PC for your living room.

However, the second group of products are clearly further up the evolutionary ladder, and are much better adapted for life in the living room.

Fujitsu-Siemens' Scaleo E has strong appeal because its design is so similar to that of an ordinary VCR or DVD recorder.

It's equipped with two Scart connectors so you can plug it straight into your TV and use it to replace your existing recorders in a matter of seconds. We also like the £699

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ASUS recommends Microsoft® Windows® XP Professional



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\*Based on LinkStation Multimedia Home Server 300 GB, model HS-D300GL. Values listed are approximate. \*Approximates based on typical length, compression and resolutions.

**ON TEST**

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Editor's Choice

# Making music

**Budding artistes no longer need a truckload of equipment to record their creations. All you need is a PC and one of these low-cost virtual studios. Niall Magennis reveals all**

**'There's a whole heap of budget music software out there waiting to inspire you to create the next big track'**

**M**aking records in the old days used to involve truckloads of instruments, masses of expensive recording gear, a couple of bearded sound engineers and a narky producer to shout abuse at the stoned musicians.

For better or worse, those days are now long gone. In the 1990s, music recording really moved into the digital age thanks to the appearance of virtual studio packages for the PC and Mac. Suddenly anyone with a home computer could put together a professional-sounding track, master it and burn it to CD ready to play in clubs or on the radio.

We've already seen a whole wave of bedroom producers assault the charts including the likes of The Streets, the Go! Team and Daniel Bedingfield.

These people have shown that you don't need expensive equipment to make successful records. Instead you can rely on your PC, some cheap software and lots of inspiration.

In fact there's a whole heap of budget music software out there waiting to inspire you to create the next big track. That's why we decided to pit the very best of these low-cost offerings against each other.

The results were quite surprising. We found that for a minimal outlay, today's music software allows you to kit yourself out with an impressive armoury of virtual synths, samplers and effects boxes. In fact, all the packages we've looked at offer bags of features for very low prices. So read on and find out which one is best for you.



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# Arturia Storm 3

Price £129.99 Contact [www.arturia.com](http://www.arturia.com)



Left: A good range of sound modules are built in as standard

Above: The piano-roll editor allows you to enter more complex Midi patterns

Arturia is probably best known for its virtual recreations of classic Moog synths, but the company also makes its own studio package.

Storm isn't really a challenger to all-singing, all-dancing sequencers such as Cubase and Sonar. Instead it's much more similar to the likes of Propellerheads Reason, where you create your own custom studio by selecting modules from a predefined list and slotting them into a virtual rack.

The software includes 14 virtual instruments that cover a pretty broad range of sounds. For example, the Arsenic module can be used to create old Roland TB303 acid bass lines, but if you want a heavier bottom end, the Bass 52 synth provides sounds close to real bass instruments. As well as the monophonic synths there are a few polyphonic instruments that are suitable for creating melodies or chord sequences.

No studio would be complete without a bunch of samplers and Storm includes two of these (or three if you count the novelty vinyl deck module that lets you scratch samples). The Eztrack sampler lets you record audio into the program from your soundcard and then play it back along with your other musical patterns. The second module, called H3OPlus, is what you'll mostly use for adding the pre-recorded loops from the program disc into your compositions. It's a neat little four-track sample player that automatically time stretches loops to fit your tracks.

Naturally there's also a range of effects that you can add into the rack, including distortion, delay (or echo in layman's speak), flange and chorus modules. Setting up effects routing is very easy because each synth and sampler module has its own effects 'send' mini-window.

Music creation in Storm is achieved by first building short patterns of notes and then stringing them together in the main sequencer, so pretty much all the modules have their own built-in piano-roll editor for creating these patterns. These editors appear in the middle of the module and, as they are quite small, can be a little bit tricky to program with a mouse, but fortunately you can call up a much larger grid view where editing is a little easier.

If you don't fancy creating your own patterns straight away, Arturia has pre-loaded the modules with sequences and samples that you can string together to build new songs. However, there aren't all that many of them, and the quality isn't always great.

To build the patterns and samples into a track, you use the sequencer at the top of the main interface. It's not always as intuitive as it should be, so you'll have to spend a little time figuring out how it works, but with practice you can create quite complex arrangements. However, the editing tools are quite limited, so it's not as powerful as the arrange windows in the likes of Cubase SE or Sonar Home Studio.

Although there's no real upgrade path from Storm, the software does support the Rewire protocol, which means it can link in with other Rewire-compatible applications such as Sonar and Cubase.

All in all, this is a good application for those who want to create electronic or dance music, as it provides a decent range of modules in one relatively easy-to-use package. However, the price is a little bit high and it doesn't have the raw features to compete with the likes of Cubase SE and Sonar Home Studio for more general music making.

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## Verdict

**Pros** Lots of built-in sound modules; easy to use; good effects

**Cons** Only really suitable for creating electronic music; some of the pre-set patterns and samples are poor

**Features** ★★★★★

**Ease of use** ★★★★★

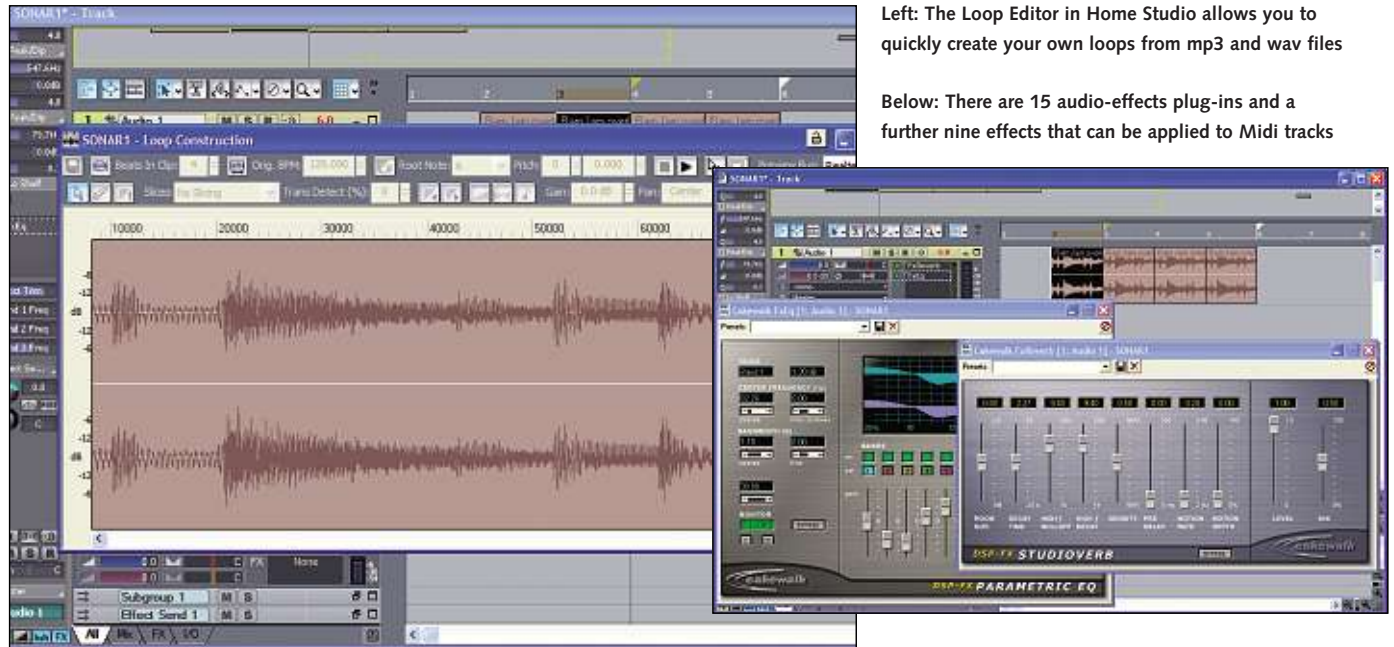
**Value for money** ★★★☆☆

**Overall** Storm is a neat package for those who want to create electronic and dance music with the minimum of fuss, but its sequencer and editing tools are a bit limited

★★★★☆

# Cakewalk Sonar Home Studio 4

Price £79 Contact [www.cakewalk.com](http://www.cakewalk.com)



Left: The Loop Editor in Home Studio allows you to quickly create your own loops from mp3 and wav files

Below: There are 15 audio-effects plug-ins and a further nine effects that can be applied to Midi tracks

**H**ome Studio is based on Cakewalk's professional Sonar software, which has been one of the best sequencers on the PC platform for many years now. It comes with a slightly trimmed-down features list in comparison to its illustrious sibling, and thankfully also a trimmed-down price tag.

Cakewalk and Steinberg have been battling it out for supremacy in the sequencer market for years, so it's not surprising that both match each other blow for blow in terms of features, and that both packages share an awful lot in common.

For example, Home Studio has a similar arrange window to Cubase SE where you can record audio and Midi side by side. Here you can spilt up longer tracks into shorter pieces and easily move them around on the timeline. But you can also perform other edits including adding automation to create volume ramps and the like.

When it comes to more in-depth editing of Midi data, Cakewalk provides a wealth of different options spread across the three distinct Midi editors, but most people will end up sticking to the easy-to-use piano-roll editor for most tasks.

Home Studio 4 also provides good looping features. The Loop Explorer allows you to search through the audio files on your hard drive and audition loops at the same tempo as your current project.

Cakewalk has included its own loop library on the disc, but you can also quickly create your own loops out of mp3 and wav files from within the application.

The software comes with 15 audio effects plug-ins and a further nine effects that can be applied to Midi tracks.

You also get three software synths, including a virtual analogue synth and a Virtual Sound Canvas plug-in for more general sounds. On top of this, it supports DirectX and VST plug-ins, so you can add lots of extra effects and plug-ins later if you feel the need.

A welcome addition to this version is the Track Presets feature. This lets you set up a track's inputs, outputs and effects and then save the whole lot as a preset to call up at a later date.

You could, for example, create a preset that you use for guitar tracks complete with effects and equalisation (EQ) settings and quickly recall it every time you start work on a new guitar project.

Mixing and mastering are also spot on as the mixer in Home Studio is clearly laid out and clearly labelled, so it's really easy to add both inserted and global effects. Naturally the automation of mixes is fully supported.

Of course, because this is essentially just a cut-down version of Sonar, there's an upgrade path clearly laid out for you up to the professional package, but Home Studio also supports the Rewire protocol so you can also easily integrate other applications such as Reason or FL Studio into it and use their synths in your projects.

Sonar Music Studio is a great product that packs in lots of excellent features. But it is worth remembering that this is a serious music studio tool and is not aimed at absolute beginners.

It will take quite a while to learn how it all works and even longer to get the most out of it. However, those who do persevere will find themselves richly rewarded.

YYePG Proudly Presents, Thx for Support

## Verdict

**Pros** Bags of features; great new Tracks Preset feature; top-notch editing tools

**Cons** Can be a little bit tricky to use

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

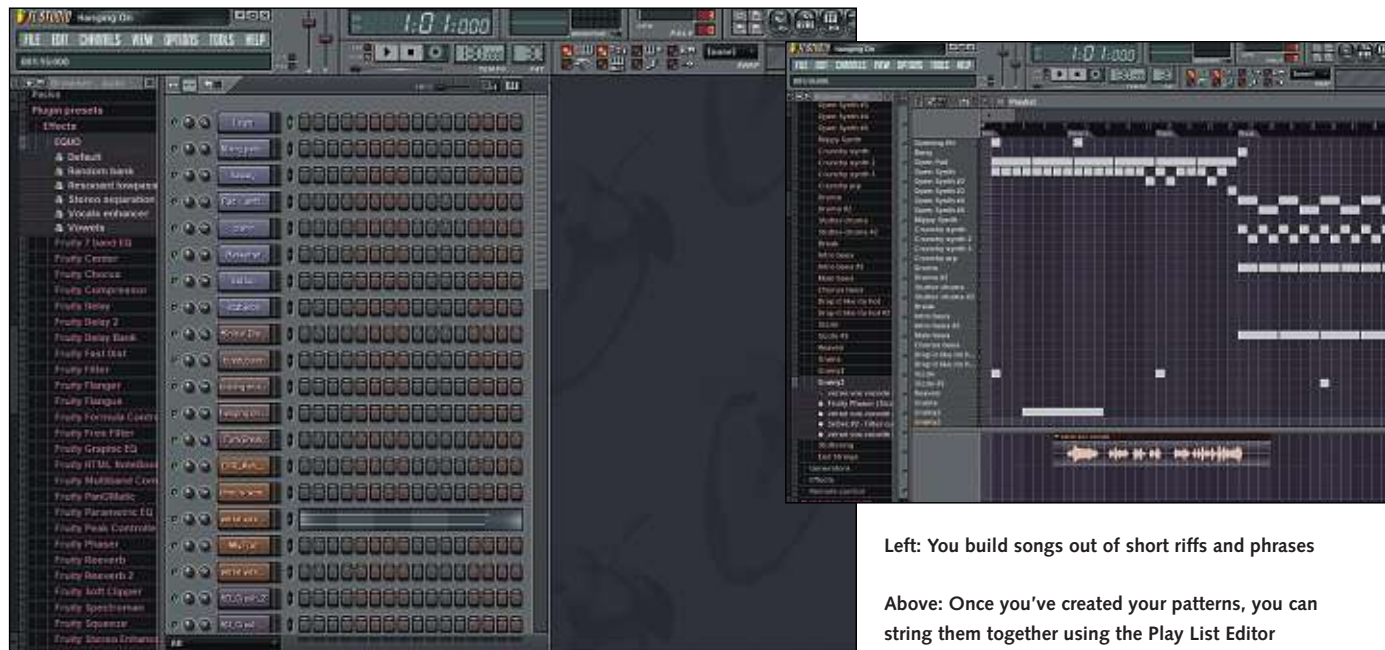
**Overall** This is a first-class music sequencer from Cakewalk, and, although it's not exactly easy to use, it does reward those who take the time to learn all its ins and outs

★★★★★

# Image Line FL Studio 6



Price £89 Contact [www.flstudio.com](http://www.flstudio.com)



Left: You build songs out of short riffs and phrases

Above: Once you've created your patterns, you can string them together using the Play List Editor

When it first appeared, this software was a pretty basic program for knocking together drum loops. Over the years it's grown fatter on its success and piled on the features. Now you can use it to create not just drum breaks, but whole songs, because it includes lots of synths, drum machines, samplers and effects along with quite complex arranging and mixing tools.

FL Studio is at heart a pattern-based sequencer. You put together tracks by creating short patterns of one or more bars, before telling the software how you want it to string them together into a song. The patterns are created using the step sequencer that is tied to each channel in the main window. The arrangement of these patterns is then built up using the Play List editor, which looks a little bit like the arrange window in Cubase or Sonar, except it's much simpler.

This pattern approach makes it really good for building dance or electronic music that's based on repeating riffs and phrases, but it also means that FL Studio isn't really suitable for those wanting to create pop or rock tunes.

The step sequencer makes the software easy to get to grips with. However, using the step sequencer all the time can become a bit limiting, especially when you want to enter more complicated synth patterns, so you'll be thankful a piano roll editor has been added to this latest version.

Patterns can be used to trigger either samples or virtual instruments. There's a good range of samples and virtual instruments included, so you get a wide sonic palette to choose from straight out of the box.

But FL Studio also works with a huge number of plug-ins, so you can load up VST plug-ins or Buzz instruments to enhance its sound-making capabilities.

One of the best things about FL Studio is the way it makes it easy to tweak your sounds. When you click on a track in the step sequencer, it brings up the channel settings window that lets you quickly change all the main parameters you'll need to tweak, including pan and volume controls as well as pitch and filter cut-off.

Once you've completed your patterns, you can switch to the Play List editor where you arrange your patterns into full songs. Patterns are listed horizontally and you draw in blocks along the timeline for where you want each individual pattern to play. The system is functional, but not quite as straightforward to use as the arrange window in Cubase or Sonar, because you have to keep track of which samples or instruments you've set to play in each pattern.

We weren't that keen on the non-standard way FL Studio approaches some tasks. For example, certain effects settings are tweaked via the track-settings box, but others are tweaked via the mixer. They should really all be grouped together. Matters aren't helped much by the manual, which simply fails to cover some areas of the application properly.

Nevertheless, despite its small quirks, FL Studio 6 is great fun to use and offers a vast range of music-making features, especially for those interested in creating dance music. And its Rewire support means you can use it in conjunction with applications such as Reason and Cubase, if you feel the need to upgrade later.

YYePG Proudly Presents, Thx for Support

## Verdict

**Pros** Good range of samples and virtual instruments; easy to use

**Cons** Some functions behave in a non-standard way

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** FL Studio is easy to use and has good sounding synths so it's a fine option for those wanting to create dance or electronic music on a budget

★★★★★

# Magix Music Studio 11 Deluxe

Price £49.99 Contact [www.magix.com](http://www.magix.com)



Left: The Midi Studio package has a tired-looking interface and is difficult to use

Below: The Audio Studio package is a bit more fun thanks to the good array of virtual instruments



Unlike all the other packages reviewed in this test, Music Studio Deluxe is not a single application. Instead it is a combination of two separate packages. The first is Midi Studio, a slightly old-fashioned Midi sequencer and the second is Audio Studio, a more up-to-date multi-track audio recorder.

Although they're bundled together in the same package they don't have all that much in common. In fact, the only real integration between the two is the way you can export an audio downmix of your Midi tracks into the Audio Studio application.

The Midi Studio interface is based on that of the Logic sequencer, which used to be available on PCs before Apple snapped it up and made it Mac only. It allows you to record Midi and audio side by side in the main arrange window. Midi tracks can be edited in a similar way to Cubase SE in that you can chop up longer parts in the arrange window and easily move them around on the timeline. You can also perform similar tricks with audio parts.

Unfortunately, the software looks and feels as if it's been teleported from a bygone era and beginners will find it quite tricky to pick up even the basics. Also setting the software up to work with our soundcard proved problematic and it never really performed in a satisfactory manner during our testing period. Often it simply refused to play back audio for no apparent reason.

Thankfully the Audio Studio application behaved a little bit better. It's a multi-track audio recorder where you build songs by laying down audio files on different tracks in a timeline window. The software includes a number of virtual instruments so you can create your own drum breaks or synth lines. These are then

automatically added on to the track you have selected in the timeline view.

The virtual instruments are competent rather than outstanding with none really on a par with the type you'll find in, say, FL Studio. However, they are loads of fun to use, especially the Robota drum machine that comes with plenty of dirty-sounding drum kits.

On the disc you'll find a decent number of loops and template songs that you can use to build your own tracks. They vary in quality somewhat, but a fair few of them are quite usable.

Naturally the software also has time-stretching features so you can fit loops of varying tempo into the same song. However, the time-stretching works in quite a clunky way, especially when compared with competing products such as Sony's Acid.

Once you've completed your track you can brush up the overall sound using the mastering tool before burning the results to your own CD.

As this bundle sits at the top of the pile of Magix's home-music software, there's no real upgrade path. Of course, that means when you outgrow its limitations you'll have to move on and learn a completely new package such as Cubase or Sonar.

So while there are plenty of good points about this software, it's let down by the fact that it never feels like it's a completely integrated package. We can't help thinking that Magix needs to add Midi support to the Audio Studio application and do away completely with the old Midi software. At the moment the package is just too much of a Jekyll and Hyde character to really recommend.

YYePG Proudly Presents, Thx for Support

## Verdict

**Pros** Plenty of features; lots of built-in effects and instruments

**Cons** Two different packages to learn; Midi software is outdated

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** It might be cheap, but this package from Magix isn't all that easy to learn and we don't like the way it's split over two different applications

★★★☆☆



# Steinberg Cubase SE 3

Price £109.99 Contact [www.steinberg.net](http://www.steinberg.net)



Left: Audio and Midi tracks can sit alongside each other in the main arrange window

Above: Only three virtual instruments are included as standard, but lots of free VST instruments are on the web

This is the cut-down version of Steinberg's all-conquering Cubase SX package that's used in studios the world over. Cubase is currently the best sequencer available on the PC, but with this cut-down version has Steinberg thrown the baby out with the bath water?

This is a traditional sequencer, by which we mean that it hasn't been designed as a loop-construction tool so it doesn't come with a heap of patterns and samples that you can bolt together to create songs. In fact Steinberg includes only a few tutorial songs on the discs.

Instead you get a hefty package that's intended for serious multi-track recording use. Be under no illusion, just because it's a cut-down version of the professional software doesn't mean SE is light on features. In fact it's stuffed full of them, and is a bit daunting for the beginner. But if you put in the time to learn the package, you'll be heavily rewarded.

The program is supplied with a pretty limited range of instruments as standard. You only get the simple LM 7 drum module as well as the CB1 virtual bass guitar and the universal synth module for more general sounds. That's your lot. However, this isn't such a major issue because there are lots of free VST instruments available on the Internet you can download and use from within the software. Also things are a bit better when it comes to effects. There are 24 of them, including compressors, distortion, delay and chorus modules.

Cubase records both Midi and audio data and both appear side by side on a horizontal timeline in the main arrange window. You can record up to 48 tracks of audio in SE and it's easy to edit the results either

directly in the arrange window or by opening the track in the dedicated audio editor.

Similarly, you can edit Midi recordings directly in the arrange window. It's easy to chop up areas of your recording to move them around on the timeline or quantise parts to fix up dodgy timing in your playing. For more in-depth editing, Cubase offers a total of four different editors, but mostly you'll just use the simple piano-roll-style layout of the Key editor.

Once you've finished editing your tracks, you'll find the features for mixing pretty comprehensive, too. The main mixer has space for five insert effects on each channel and you can record the movements of all the knobs and sliders to create automated mixdowns.

In fact the software has so many recording, editing, mixing and mastering features that it offers all the tools you need to put together really professional-sounding tracks.

However, there are some areas where the software could be improved. Its automatic looping tools are poor, so if you've used other entry-level programs for building tracks from pre-recorded loops, you'll find the time-stretching features in Cubase pretty unintuitive.

But despite these failings, the software remains a real winner. No other package offers such an enormous range of features for such a low asking price. If you're serious about making music, then this is a great choice that will grow with your needs for years to come. And should you outgrow SE, there's an upgrade path all the way up to the professional Cubase SX product.

YYePG Proudly Presents, Thx for Support

## Verdict

**Pros** Great range of features;

comprehensive editing tools

**Cons** A bit daunting to learn

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** A very powerful and affordable product that offers everything you need to make great-sounding tracks, but it's not for absolute novices

★★★★★

## Budget audio-sequencing software



MANUFACTURER	ARTURIA	CAKEWALK	IMAGE LINE	MAGIX	STEINBERG
Product	Storm 3.0	Sonar Home Studio 4	FL Studio 6	Music Studio 11 Deluxe	Cubase SE 3
Price	£129.99	£79	£89	£49.99	£109.99
URL	www.arturia.com	www.cakewalk.com	www.flstudio.com	www.magix.com	www.steinberg.net
Free trial available	✓	✓	✓	✗	✗
<b>MIDI FEATURES</b>					
Number of tracks	Unlimited	Unlimited	999	Unlimited	Unlimited
Midi playback	✓	✓	✓	✓	✓
Midi recording	✓	✓	✓	✓	✓
Midi file import	✓	✓	✓	✓	✓
Editors	Step, piano roll	Piano, event, staff	Step, piano roll	Event, score, transform, matrix	Key, list, score
Drum editor	✓	✓	✓	✓	✓
Step recording/input	✓	✓	✓	✓	✓
<b>AUDIO FEATURES</b>					
Number of audio tracks	Unlimited	64	999	64	48
Audio playback	✓	✓	✓	✓	✓
Audio recording	✓	✓	✓	✓	✓
Stretch for audio loops	✓	✓	✓	✓	✓
Slicing for audio loops	✗	✓	✓	✓	✓
24bit recording	✓	✓	✓	✗	✓
32bit floating point audio resolution	✓	✓	✓	✗	✓
CD audio grabbing	✓	✓	✓	✓	✓
Mp3 export	✗	30-day trial encoder	✓	✓ (Demo valid for 20 runs)	Available as paid-for upgrade
<b>EFFECTS AND INSTRUMENTS</b>					
Number of audio effects	10	15	26	15	24
Number of Midi effects	0	9	0	0	14
Number of virtual instruments	14	3	11	6	3
Sample library included	✓	✓	✓	✓	✗
VST plug-in support	✗	✓	✓	✓	✓
DXi plug-in support	✗	✓	✓	✓	✗
<b>GENERAL FEATURES</b>					
Unlimited undo and redo functions	✓	✓	✗	✗	✓
User-definable macros	✗	✓	✗	✗	✓
Hardware controller support	✓	✓	✓	✓	✓
CD burning	✗	✓ (via Pyro)	✗	✓	✗
ASIO support	✓	✓	✓	✓	✓
Rewire compatible	✓	✓	✓	✗	✓
Tutorial included	✓	✓	✓	✓	✓
<b>SCORES</b>					
Features	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★★
Ease of use	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value for money	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★★
<b>OVERALL</b>	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★★

# Setting up your home studio

If you plan to use your PC as the centrepiece of a home studio, you'll need a decent soundcard. The quality of integrated soundcards has increased a lot over the years, so even if your computer has an onboard sound chip, it'll do a reasonable job of recording and playing back audio.

However, to record live instruments, you may find it's more convenient to use a soundcard with a breakout box that has full-sized audio and Midi connectors. Many options are available ranging from Creative's Soundblaster X-Fi Platinum (£140) to the more professional M-box 2 from Digidesign (about £300).

To go with the soundcard you'll want some speakers or, at the very least, a decent pair of headphones. Most producers use monitor speakers designed to give a neutral sound. If you mix your tracks using these 'neutral' speakers, your songs should sound good on everything from transistor radios to high-end hifi systems. The classic monitor speakers were the Yamaha NS10s, but lots of other companies produce monitors, including Behringer and Edirol. Prices start at around £80 for a pair of Edirol MA-7As. If you plan to use headphones instead, look for brands such as AKG and Sennheiser.

Look for 'neutral' speakers, such as the Edirol MA-7As



Some keyboards, such as the Oxygen 61, include controller knobs and sliders

Most music applications allow you to enter notes on a grid using your mouse, but it's easier to input notes using a music keyboard even if your keyboard skills are poor. The knobs and sliders on most virtual synths can also be controlled via hardware Midi controllers, allowing you to physically tweak various settings. You can kill two birds with one stone by opting for a keyboard that includes controller knobs and sliders, such as the Oxygen 61 from M-audio (about £160).

Don't forget that if you want to record live instruments you're going to need microphones. What type of mic you opt for depends on what instrument you're trying to record, and there are no hard and fast rules. One word of caution – many professional mics can't feed the correct signal to a standard soundcard without a pre-amp in between.

You may also need a mixer if you want to mix external sound sources, such as Midi sound modules, with the music coming from your computer. There are plenty of low-cost mixers around with prices starting at around £20 or £30 for very basic models.

## Editor's Choice

Editor's Choice Steinberg Cubase SE  
Recommended Image Line FL Studio 6



Steinberg Cubase SE



Image Line FL Studio 6

The majority of the applications we looked at for this test were of a very high quality. With the exception of perhaps Magix Music Studio 11 Deluxe we could recommend any of these applications. However, picking out specific products for awards was a tough job, especially as products are pitched at slightly different audiences.

Although it's the cheapest product on test, we felt that Magix Music Studio 11 Deluxe was the runt of the bunch. We didn't like the way the package is split over two applications, especially as they both use completely different user interfaces. It means you have to master two ways

of working just to get up and running. It's a shame because if Magix could integrate the Midi features into the Audio Studio application, it would have a potent budget application on its books.

Storm, on the other hand, is great fun to use, especially if you're into creating dance music. It's aimed at beginners and is easy enough to pick up. However, we weren't completely convinced by its mediocre arranging tools.

Cakewalk's Sonar Home Studio is pitched at those with a little more knowledge of music making. It's an excellent product with a stunning range of features and there were elements we  
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loved. However, we felt it just wasn't user-friendly enough to deserve one of our awards.

Our Recommended award goes to Image Line's FL Studio 6. It's great for producing pattern-based tunes such as dance and electronic tracks, and easy to use even for beginners. It also has a good range of built-in synths and samples and can be linked to other programs that use the Rewire cross-platform system.

However, there was only ever going to be one winner of our Editor's Choice award – Steinberg's Cubase SE. This brings professional features within the reach of everyday users. It may be a cut-down version of Steinberg's premier Cubase SX package, but the features that have been removed are those that most bedroom producers won't miss.

It's not for absolute beginners, but it's ideal for those who want to use their PC for serious music making and put in the time to learn how to use a top-quality virtual studio package. **PCW**

**'Cubase brings professional features within the reach of everyday users'**

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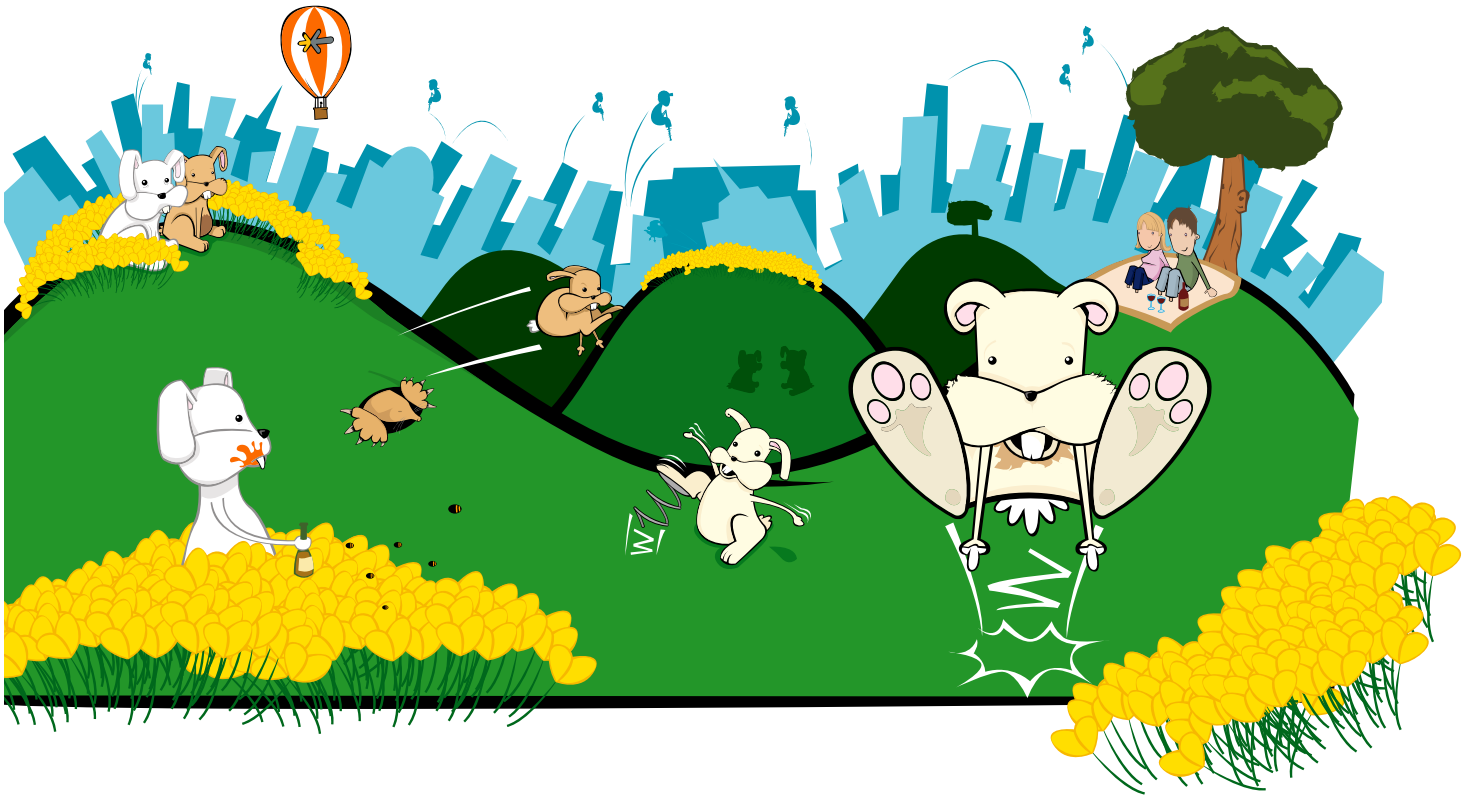
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**ON TEST**

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Editor's Choice

**'If you're going to use them where you have access to a decent aerial, they're an inexpensive way to get some free mobile entertainment'**

# Telly on a stick

**With the World Cup just around the corner, make sure you never miss a game by watching it on your laptop. Terry Relph-Knight checks out six tiny USB2 Freeview TV tuners**

**S**mall computers and televisions have a close relationship. Early PCs commonly used a TV as the display screen and later models relied on CRT monitors, then they moved to LCD monitors. Both display technologies were developed for television.

Most of the components of a television receiver are already present in a PC as hardware, or can easily be simulated by software. The missing components are an aerial pre-amplifier, tuner and, for analogue transmissions, circuitry to convert the analogue signal into a digital format. For digital terrestrial TV (DVB-T), although the programme signal must be demodulated, conversion isn't necessary and a plug-in DVB-T adapter can feed the PC with the compressed mpeg2 picture stream. Internal PCI TV tuner cards have been with us for some time, but USB1.1 with a maximum data rate of

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12Mbits/sec wasn't really fast enough for TV use. Only USB2 with its 480Mbits/sec data rate has ample bandwidth to handle the 12-20Mbits/sec of compressed high-definition TV (HDTV) or the 4-6Mbits/sec of compressed standard broadcast (Pal) TV.

The latest and smallest DVB-T adapters reviewed here look just like USB2 Flash drives (or 'sticks'). Although they all ship with a miniature aerial, in many locations its low sensitivity and lack of directionality won't be good enough and, as it says in the small print for most, a full-size, digital-compatible roof aerial will be needed. This limits the promise of portability these DVB-T tuners offer unless you're in a strong signal area. But if you're going to use them in your study or hotel room where you have access to an aerial, they're a cheap way to get some free entertainment.

# Freecom DVB-T USB Stick

Price £38.31 Contact [www.freecom.com](http://www.freecom.com)



**F**reecom's DVB-T USB Stick seems to be the most widely available and popular example of this product group at the moment. Its rounded casing appears to be sprayed with the same, velvety-black, rubber paint that adorned the Psion series 5. Closer examination reveals that it's not a finish but a tough case material, a resilient plastic. Aerial connection is through a 2.5mm mini coaxial plug on the opposite end of the case to the USB plug. Included with the tuner are

a USB extension cable, a mini-remote control and a 135mm stick aerial, with a magnetic base and a 1.25m captive cable terminating in a standard coaxial plug. There's also a screw-on sucker base for the aerial and a standard-to-mini coaxial adapter.

Freecom's install CD is unusual for this product group because it requires a serial number, printed on the CD sleeve, to complete the install. Two programs are installed; the Freecom DVB-T Player and a second executable, not mentioned in the manual, that enables the infra-red remote control. A green activity LED on the tuner stick flashes orange when the signals from the remote are being received.

The DVB-T Player application uses a two-pane display plus separate control panel layout. There is a status display in the middle of the control panel showing selected channel, volume level and so on, with a simulated numeric keypad and option buttons on the left and a round, dial-like set of transport controls for record and play on the right. As with most of the applications for these tuners, right-clicking on the viewing window displays a vertical menu strip that provides access to many of the software controls and settings.

Aerial signal sensitivity seems reasonable and with its easy-to-use software, remote control and below average price, this is an attractive product if you don't require both digital and analogue operation.



## Verdict

**Pros** Includes a remote and the viewing software is easy to use  
**Cons** Only digital; no software extras  
**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

**Overall** The Freecom DVB-T USB Stick offers good basic digital TV tuner functionality at a reasonable price

★★★★★

# Hauppauge WinTV-HVR 900

Price £63.44 Contact [www.hauppauge.co.uk](http://www.hauppauge.co.uk)



**T**he Hauppauge WinTV-HVR 900, like the Terratec Cinergy XS, is a hybrid analogue/digital tuner. Its aerial comes in three screw-together sections; the rubber-covered magnetic base, a large loading coil and a wire aerial. The aerial assembly stands 35cm tall. This is fitted with a standard coaxial cable that is 0.7m long. Conscious of the mechanical risks of plugging large USB devices directly into laptop USB ports, Hauppauge provides a short USB2 extension lead.

The Hauppauge WinTV software looks a bit daunting and rough around the edges compared to some of the applications shipped with other tuners in this test, but it does have some useful diagnostics. Immediately following installation, WinTV 2000 opens Channel Manager. This application has four tabs; Scan, Sources, Devices and Channels. Selecting the Devices tab allows you to see that the WinTV hardware is plugged into a suitable USB port and recognised, by listing all the available device abilities, such as analogue tuner, DVB-T tuner and so on.

Before you can use the WinTV-HVR 900, you must scan for available channels. If the aerial signal is too weak, the software may well get stuck permanently in scan mode. The main viewing application is WinTV 2000, which has a number of control buttons for program select, channel browsing, still snapshots, audio level and so on grouped to the left of the video window.

Hauppauge also includes WinTV32, which is a simpler viewing application with fewer options and controls; Scheduler, which handles scheduled program recording as a separate application; and Primary, which controls basic display and mpeg playback options such as overlay mode and hardware motion compensation.

The WinTV-HVR 900 is dual format and has high signal sensitivity, but no remote control. The software components are comprehensive but not well integrated.

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## Verdict

**Pros** Dual format; good signal sensitivity; standard coaxial connector to the tuner  
**Cons** High price and software that is complicated by the dual format  
**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

**Overall** Although the Hauppauge WinTV 2000 is a dual-format analogue and digital tuner, it's expensive considering there is no remote control or A/V breakout cable

★★★★★

# KWorld DVBT-350U

**Price** £35.94 **Contact** www.kworld.com.tw/uk



**T**he KWorld DVBT-350U has a rectangular extruded aluminium case, helping to keep the device cool. An adapter is included to convert the 2.5mm mini coaxial aerial connector in the end of the case to a standard-size aerial coaxial plug, although the 13.5cm mini stick aerial supplied has a 1.2m cable that also terminates in a 2.5mm coaxial plug. A screw-on cup converts the aerial from magnetic mounting to suction mount.

There are three separate install options on the KWorld CD menu; install USB drivers, the DVB-T Plus viewing application and Microsoft Direct X 9.0c if required. So unlike all the other products in this group test, the USB drivers and the viewing application must be installed separately and sequentially, and installation does not automatically launch the viewing application in program scan mode. But scan mode is activated the first time the viewing application is launched, and on our test system this triggered a warning from the Windows firewall that it was blocking some requests from this program.

DVB-T Plus uses a viewing window and separate control panel layout and looks rather crude compared to the software for the other products in this test. The control panel is split vertically into three zones. Status displays for time, signal levels and so on are shown at the top, a simulated keypad and program option buttons occupy the middle, and at the bottom is a round, dial-like set of simulated VCR transport controls.

In terms of hardware this is a no-frills product – there are no indicator lights, no remote control, no carry bag or A/V breakout cable, but the aluminium case seems tough and offers an extra level of cooling. The software is on the crude side, but has basic mpeg2 file-editing capability and DVD/VCD/SVCD-recording options, in addition to the usual hard-disk recording.

## Verdict

**Pros** Software includes mpeg-editing and DVD-burning software

**Cons** Basic hardware; no remote control

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** The KWorld DVBT-350U provides basic functionality but is unimpressive apart from the inclusion of some editing and burning software

★★★★★

# MSI Mega Sky 580

**Price** £29.89 **Contact** http://msicomputer.co.uk



**M**SI's Mega Sky 580 has a two-tone body of glossy black and off-white pearlescent plastic. Included with the tuner are a mini-remote control, a coaxial adapter and a simple 140mm aerial, with a magnetic base and a 1.9m cable with a standard co-axial connector. Also included are a useful nylon carry pouch and a nylon cord loop that can be used to tie the USB stick and its protective cap together, to stop the cap getting lost.

MSI supplies Newsoft's Presto PVR5 application with its tuner. Following installation, Presto should display the identity of the tuners plugged into the system's USB ports in a dropdown menu box. Usually there will only be one, the MSI Mega Sky 580, identified as 'Digital TV USB Mini Receiver'. With the tuner selected, the next step is to scan for channels. Once the scan is complete, the channel list is saved until you decide to re-scan. Unfortunately the MSI Mega Sky 580 proves to be one of the less sensitive tuners, and Presto PVR5 was unresponsive and unstable on our test system. There's a live update feature, but this requires providing an intrusive amount of personal information before it will grant access to any updates.

In normal use, Presto PVR5 displays as two panes; the view pane and a control-panel pane. The control panel displays time and device indicators, such as signal strength and volume level. Along the bottom are the recorder 'transport' buttons and, to the left, buttons for volume level, program select, electronic programme guide (EPG), Teletext and subtitle on/off. Scheduled programme recording is done by selecting required programmes from the scanned EPG list.

The MSI Mega Sky 580 is the lowest-priced product reviewed in this group test and it offers a lot for your money. It's a shame it is let down by the lack of signal sensitivity and instability in the Presto PVR5 software.

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## Verdict

**Pros** Low price; easy-to-use software; remote control and carrying pouch included

**Cons** Low-sensitivity tuner; software update unlock requires too much personal information

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** Although the software may be unstable on some systems, this is well-featured and easy-to-use

★★★★★



# Pinnacle PCTV USB Stick

Price £49.99 Contact <http://estore.pinnaclesys.com>



**P**innacle's PCTV USB Stick has a gloss white plastic case with an infra-red sensor for the included remote control, plus an indicator LED on one side. The aerial connection is via a standard 10mm coaxial connector at one end of the case. It is supplied with a simple 145mm, magnetic-base wire aerial with a 1.25m cable and a mini remote control.

Pinnacle's own software, PCTV TVCenter, uses a standard Pinnacle install module with required

registration fields and a serial number, but in this case the serial field is pre-filled. Microsoft's .Net Framework 1.1 is a required component and is installed if not present.

A complete install of the Pinnacle software takes a considerable length of time and requires a reboot. Once it is complete, it displays a splash screen to welcome you to the Pinnacle Mediacenter, offering you complete remote-control playback of TV, photos, audio and video files and DVDs. The software allows you to check for updates and then scan for DVB-T radio and TV stations.

By default, three shortcut icons are installed onto the desktop; Pinnacle TVCenter, Mediacenter settings and TVTV. Pinnacle TVCenter is the TV viewing program that runs as a single window with the TV display in the centre and simple icon-driven menu bars top and bottom. Mediacenter settings allow you to set a substantial range of options for the main application, and TVTV is a handy link to [www.tvtv.co.uk](http://www.tvtv.co.uk), a free programme listings site run by Sony.

Pinnacle is a major player in the video and video-editing software market, and this is reflected in the substantial nature of the software with this product. The inclusion of a remote and the use of a full-size co-axial connector on the tuner stick are both positive points in favour of the Pinnacle PCTV USB Stick. However, it does come in at a little above the average price for the products in this group test.

## Verdict

**Pros** Uses a standard aerial co-axial connector, includes a remote control and comprehensive software

**Cons** Extensive use of icons makes the software look glossy, but it's a little hard to use

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** Although the Pinnacle PCTV USB Stick is a solid product, given the company's eminence in the video software market you might expect a bit more

★★★★★

# Terratec CinergyT USB XS

Price £60.22 Contact <http://uk.terratec.net>



**L**ike the Hauppauge product, the Terratec CinergyT USB XS is a hybrid digital/analogue tuner. The plastic case of the tuner has a cheerful orange and white colour scheme, which is carried through to the full-size remote control, with its orange buttons and white legend. A 2.5mm stereo jack is used for the aerial connection – a short adapter cable is provided for connection to a standard coaxial aerial. The 140mm wire aerial has a magnetic base and a 1.2m cable, terminating

in a 3mm jack plug. Also included are a short USB extender cable and, unusually, an A/V breakout cable that plugs in to a mini-USB socket on the end of the tuner stick next to the aerial jack. S-video, RCA phono and 3mm stereo-jack sockets on the breakout allow for external audio and video inputs.

The main viewing application is Cyberlink Power Cinema 4, a home-theatre application. When first run it displays a full-screen splash, inviting you to optimise your PC for multimedia use without explaining what will happen to your PC if you accept. If you do accept, there are entries for screen aspect ratio, number of loudspeakers, country, type of TV tuner and scan options. From then on Power Cinema operates in full-screen mode by default, with large bold graphics.

There's a reliance on icon-style controls, and menus are displayed with large web-style buttons, with the picture reduced to picture-in-window when the menu 'pages' are selected. Although the software works well and looks slick, the lack of a simple pulldown menu strip is a bit annoying. You can use the standard window menu bar controls to reduce this display to an overlay window. A separate application must be installed to enable the remote-control function.

Although it is one of the most expensive products in this group test, the Terratec CinergyT USB XS has a lot of useful features.



## Verdict

**Pros** Great feature set; full-size remote control; A/V breakout cable; DVD-burner software

**Cons** Reliance on mysterious icons in the software instead of text

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** Although it comes at a premium price, the Terratec CinergyT USB XS is dual-format, plus it's the only tuner in the test with an A/V breakout and the software includes a DVD burner

★★★★★

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Mini TV tuners		Personal Computer World RECOMMENDED				Personal Computer World EDITOR'S CHOICE
MANUFACTURER	FREECOM	HAUPPAUGE	KWORLD	MSI	PINNACLE	TERRATEC
Model	DVB-T USB Stick	WinTV-HVR USB M 900	DVBT-350U	Mega Sky 580	PCTV USB Stick	CinergyT USB XS
Price	£38.31	£63.44	£35.94	£29.89	£49.99	£60.22
Telephone	01423 704 700	020 7378 1997	08701 160 800	Not specified	01753 655 999	Not specified
Sales URL	www.scan.co.uk	www.scan.co.uk	www.scan.co.uk	www.dabs.com	http://estore.pinnaclesys.com	www.scan.co.uk
Size (w x d x h) mm	28 x 86 x 15	32 x 81 x 13	23 x 97 x 10	28.5 x 83 x 13.5	31 x 84 x 15	30 x 80 x 15
Weight (g)	19	33	24	28	27	31
Supply current (mA)	450	500	500	100	500	480
Mini aerial	✓	✓	✓	✓	✓	✓
Remote control	✓	✗	✗	✓	✓	✓
USB cable	✓	✓	✗	✗	✗	✓
Aerial connector	2.5mm coaxial	10mm coaxial	2.5mm coaxial	3.5mm coaxial	10mm coaxial	2.5mm jack
Aerial adapter cable	✓	N/A	✓	✓	N/A	✓
Other connectors	None	None	None	None	None	AV breakout
Status LED	✓	✓	✗	✓	✓	✓
HDTV/DVB radio/analogue TV support	✓/✓/✗	✗/✓/✓	✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✓
Software supplied	Freecom DVB-T Player	Hauppauge WinTV 2000	KWorld DVB-T Plus, mpeg editor, DVD burner	Newsoft Presto PVR5	Pinnacle PCTVcenter	Cyberlink Power Cinema 4, MakeDVD 1
EPG/UK Teletext	✓/✗	✗/✗	✓/✓	✓/✓	✓/✓	✓/✓
Digital video recording	✓	✓	✓	✓	✓	✓
Scheduled recording	✓	✓	✓	✓	✓	✓
Time shifting	✓	✓	✓	✓	✓	✓
Still frame capture	✓	✓	✓	✓	✓	✓
Windows XP/2000	✓/✓	✓/✗	✓/✓	✓/✓	✓/✗	✓/✗
Windows Media Center	✗	✗	✓	✓	✓	✓
<b>SCORES</b>						
Features	★★★★★	★★★★★	★★★☆☆	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★☆☆	★★★★★	★★★★★	★★★★★
Vale for money	★★★★★	★★★★★	★★★☆☆	★★★★★	★★★★★	★★★★★
<b>OVERALL</b>	★★★★★	★★★★★	★★★☆☆	★★★★★	★★★★★	★★★★★

# Editor's Choice

**Editor's Choice** Terratec CinergyT USB XS  
**Recommended** Freecom DVB-T USB Stick



Terratec CinergyT USB XS

There's a wide price range for the six products in this group test, mainly because the capabilities range from simply providing a basic Freeview tuner, through to hybrid analogue and digital reception, with a remote control and even audio and video input support.

Although all the products include a mini aerial, in the small print they all recommend the use of a full-size roof aerial, and you will



Freecom DVB-T USB Stick

be extremely lucky in most cases to get a decent picture using the included aerials.

The lack of comments on, or comparisons of picture quality in these reviews is intentional, because these products were installed on the same system, one after the other. Under these conditions there was no noticeable difference in picture quality. That said, there was a variation in aerial signal sensitivity, and the lower-cost products did tend to be less sensitive.

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Our feature table includes entries for HDTV support, which reflects each manufacturer's claim. Final HDTV (high-definition TV) formats are yet to be decided and it's not yet certain when, or if, HDTV free-to-air terrestrial broadcasting will start. This means it's not guaranteed that the tuners will receive and decode eventual HDTV broadcasts.

Apart from the sensitivity issues, these products are differentiated by their extra hardware features and by the features and ease of use of the included software, rather than performance.

If you want a low-cost product, the Freecom DVB-T USB Stick gets our Recommended award, as it comes with a remote control and easy-to-use software. But our Editor's Choice has to be the hybrid analogue/digital Terratec CinergyT USB XS. Some might not like its bright case colours, but it's the only product out of the six reviewed to support audio and video input, and it's supplied with a full-size remote control and a good home-theatre software interface. **PCW**

**'The Terratec CinergyT is the only product to support audio and video input'**

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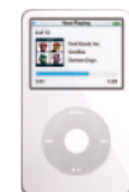


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# Talk more, pay less

*The choice of low-cost or free calls over the Internet is immense. Alan Stevens explains the options and outlines the features and cost of over 30 services*

**V**oice over broadband, Internet telephony, Voice over IP (VoIP) – call it what you will, the past couple of years have seen the unstoppable rise of the technology that lets you make telephone calls over the Internet. So much so that there's now a bewildering array of affordable consumer VoIP products and services to choose from.

All promise the same thing – cheap or, in many cases, free phone calls, using the spare capacity available on your Internet broadband connection. Exactly how that's achieved, though, can vary enormously, as can the features and optional extras included by the providers, and making sense of it all can be a mind-boggling task.

Hence this feature, in which we aim to explain what VoIP is all about and examine the pros and cons of the different home-user products and services on offer.

## Newbies start here

Like any new technology, getting to grips with VoIP can be a little daunting. However, the principles behind it are easy enough for most PC users to grasp, and best explained by comparing what VoIP does with an ordinary analogue phone call.

Make such a call via the public switched telephone network (PSTN), and you're directly connected to the other person by a private analogue circuit. A bit like having a dedicated wire between you and the other phone, even though there may be one or more switchboards in between. What you say is then communicated as an analogue signal between the handsets at each end – just as it is when you join up a couple of tin cans using a piece of string.

With VoIP, however, there's no private circuit and the analogue voice signals are digitised and encoded into TCP/IP data



A headset makes the PC-based Skype service a lot easier to use, and a cordless variety gives you even

packets. Then, just as with any other network traffic, these packets can be routed across the Internet before being decoded back into analogue voice signals at the other end.

The main benefit to this is cost – or, rather, the lack of it – especially

with the ready availability of cheap broadband services. These provide the necessary bandwidth plus, once you've paid for the connection, it doesn't cost any more to use it, whether sending an email or talking to someone on the phone – assuming you stay within any download limits set by the provider.



YYePG Proudly Presents, Thx for Support



Illustration: Steinar Lund

Of course, there are a few caveats, not least being the need for suitable hardware and/or software to do all that digitising and routing of VoIP packets. Plus, for totally free calls, the person at the other end needs to be similarly equipped and, in some cases, a subscriber to the same VoIP service provider.

It needn't cost the earth to get started, as a lot of the software is available for free and plenty of bundled services come with everything you need for a fixed monthly fee.

Prices are dropping all the time, while service providers are increasingly adding extra functionality – including free telephone numbers to enable ordinary public telephone subscribers to call your VoIP phone and for you to dial ordinary telephone numbers at much reduced rates. Voicemail services are increasingly common, along with call forwarding, music on hold, SMS facilities and a lot more.

## Getting started

So, where do you start with VoIP? Well, one of the easiest and cheapest ways is via a PC-to-PC service such as Skype (recently acquired by Ebay) or those available to users of MSN, Google Mail and Yahoo Messenger.

You typically require a PC to use one of these services, although that could be a handheld device and there are other ways

With Skype-out you can call ordinary landline telephones from your PC – as long as you have sufficient credit

Right: EQO is a third-party service that lets you make and receive Skype calls from your mobile phone

of minimising the PC dependence, which we'll discuss shortly. You'll also need suitable audio hardware; at the very least, a microphone and speakers, or preferably a headset of some kind (which could be wireless for more freedom) or perhaps a USB telephone handset.

The software needed is easy to obtain and doesn't have to cost anything. If you're already using MSN Messenger or Yahoo, for example, you probably have everything necessary, while for Skype a free download is available (from [www.skype.com](http://www.skype.com)) with versions for Pocket PCs, Apple Macs and Linux as well as Windows desktops.

Once this software is up and running, calls to other VoIP users can be made totally free of charge if they're using the same service. Connecting to other VoIP services or making calls to people who don't have VoIP is a little harder and can cost money. This is primarily because, in order to connect you to the public telephone system, the service provider needs a gateway to make calls to the people you dial on your behalf.

With Skype, two separate gateway services are available: one to let you make outgoing calls (Skype-out) and another to receive incoming calls on a standard PSTN number (Skype-in).

Skype-out is a pay-as-you-go service where you buy credit in advance to cover the cost of the calls (see screen 1). Skype-in is a subscription service costing €30 (£20.72



approx) a year, for which you'll be allocated a standard UK telephone number and a free Skype voicemail subscription.

Yahoo offers similar gateway services (note that those provided in conjunction with BT in the UK are somewhat limited), while MSN is expected to add dial-out and dial-in facilities later this year.

### Skype extras

Possibly the biggest drawback to Skype, Yahoo and similar services is the reliance on software running on a PC, which needs to be switched on in order to make and receive calls. You can cut the desktop tie with a notebook and there's a Pocket PC version of Skype for even greater mobility, but neither of these come cheap, and what you save on calls you'll spend on the hardware.

Fortunately, there's a growing market for add-ons to help get around this issue, most designed to work with Skype, but some with other VoIP services as well. For example, a number of vendors now sell telephone handsets to work with PC-based VoIP services. You can't just plug these into your broadband modem, but they do let you connect to your PC and make and

USB telephone handsets such as the US Robotics Internet Phone are available for use with Skype and other PC-to-PC VoIP services

YYePG Proudly Presents, Thx for Support

Left: The Cordless Internet Telephony Kit from Linksys lets you use a Dect handset with Skype running on your PC



receive calls remotely from the comfort of your armchair.

The cheapest Skype handsets (around £23) plug into a USB port, and there are lots of products to choose from, such as the USB Internet Phone from US Robotics (pictured far left), which costs £21.60.

Wireless models are also available, although they are a lot dearer. For example, the Linksys Cordless Internet Telephony Kit CIT200 (pictured left) costs £72 and uses a wireless Dect handset to connect to the host PC via a small USB receiver.

Completely standalone implementations of Skype and other VoIP clients on mobile handsets are also on their way. Netgear, for example, has announced a Wifi phone with Skype software that should be available later this year, and others are likely to follow.

You can also get software add-ons for Skype, from your own voicemail recorder to tools to forward calls and integrate Skype into a website or blog. A number of Skype-based services have also sprung up to further help break the reliance on a host PC. One such service is EQO ([www.eqo.com](http://www.eqo.com)), which lets you use a mobile phone to connect to your PC and make Skype calls by selecting from an on-screen 'buddy list'





Freetalk is a good example of a bundled service and phone adapter, where most of the hard setup work is done for you

(see screen 2).

## The Sip alternative

Services such as Skype, MSN and Yahoo Messenger certainly have a great many benefits. They're easy to set up, simple to use and cheap, with millions of users worldwide. However, they do tie you into a proprietary technology, which means you're totally reliant on a single provider for the service you get. There's also the reliance on a PC, and the fact that free calls are only available when you talk to people using the same service. But these issues won't apply if you opt for a standards-based alternative.

With standards-based VoIP, you're no longer tied to a PC, with a wide choice of hardware available to make and receive calls including analogue phone adapters, VoIP-enabled routers and specialised desktop and wireless IP phones. You can also mix and match products and, if you're not happy with a service provider or find a cheaper one, you can switch.

On the downside, a number of different VoIP standards have been developed, which can be confusing. However, the most widely adopted, and the one you'll encounter the most, is Sip (Session Initiation Protocol).

## A little technology

The vast majority of VoIP services are Sip-based, especially those aimed at the home user, and Sip itself is quite a simple protocol to understand. In fact, it only handles the setting up of calls, leaving the voice encoding and encapsulation, for example, to other technologies.

To do this, Sip comes in two parts. A Sip client – such as a softphone on a PC or firmware embedded into an adapter or handset – and a Sip server, typically, hosted by a VoIP service provider.

The client regularly advertises (registers) its 'presence' with a so-called Sip registrar hosted by the server. This then tells the server that it's switched on and available to make and

receive calls. The server also knows the IP address of the client, enabling it to route incoming calls to it and set up outbound calls on the client's behalf (a Sip proxy), with facilities to connect to the PSTN via a gateway to handle incoming and outbound calls. You don't have to worry about the technical details of how it all works, as all you have to set up is the client. And a lot of the time that's taken care of for you anyway.

## Sip options

There are a number of different ways to get started with Sip, the easiest of which is to sign up for a complete bundled package. Most packages will include both a subscription to the hosted VoIP service plus the necessary Sip-enabled hardware and



software; for example, Freetalk (pictured, left), Plustalk or the recently launched Tesco Internet Phone package.

Take this route and you're almost guaranteed to get a working solution plus, if problems do arise, they should be easy to resolve. Notice, too, that many of the broadband service providers also offer optional Sip-based voice products. Some are available independently, such as Nildram Voice, while others are part of an overall broadband package, such as Freedom2Surf and Wanadoo Wireless & Talk. Either way, it's worth checking with your current provider before looking elsewhere.

Alternatively, you can go it alone and source the client hardware or software independently, then connect it to one of the many VoIP services available. Some are free to join and others require an up-front subscription, but all should allow you to make calls to other VoIP users without any charges.

Calls to the PSTN, however, will require the service provider to configure a gateway (just as with Skype), and most will charge for this facility. Charges are usually on a pay-as-you-go basis, either billed in arrears or up front using credits that need to be topped up like a pay-as-you-go mobile. Some, though, also offer inclusive calling plans where for a monthly fee you might get low-cost or even free UK local and national calls, plus discounted international

As with Skype, it's possible to make calls via a Sip-based VoIP service using a softphone application running on your PC

## Changing codecs to improve quality

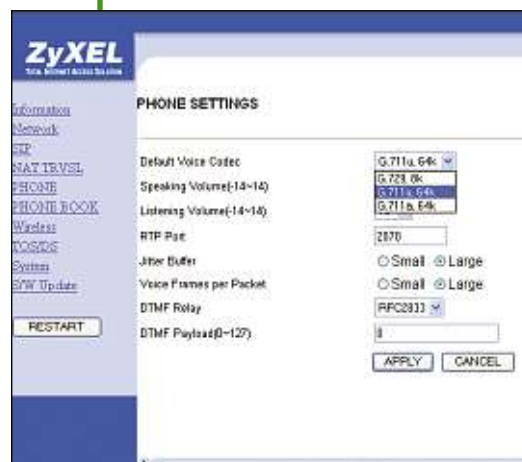
The Internet was never designed to carry voice traffic, and call quality can vary enormously. Echo effects and break-up are common, but there are ways of minimising such effects. One is to change to another

codec – the bit of software that handles the coding and decoding of the voice signal.

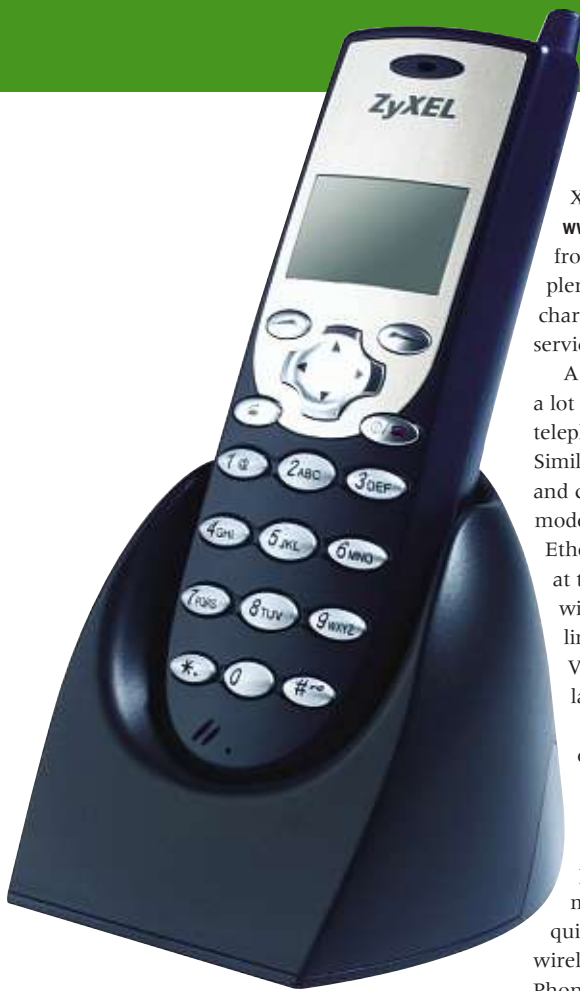
Most of the time you can leave your VoIP hardware or software to negotiate the codec when making a call, but if you experience problems, manual selection can make things better – or worse, so take care.

Exactly how you change codec depends on what you're using, and services such as Skype don't give you the option. Most of the standards-based VoIP products, however, let you choose a default or the order in which codecs will be tried. Some codecs sacrifice quality to take up as little bandwidth as possible. The popular G.729 codec is one example, requiring just 8Kbits/sec, while others give better quality for more bandwidth, such as G.711 which needs four times as much (64Kbits/sec).

Changing to another codec may improve call quality, but not always, so take care



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Sip-compatible Wifi phones let you make and receive VoIP calls via a wireless network, but they can be expensive

and mobile rates.

Similarly, if you want to be able to receive PSTN calls, a gateway is required as well as a public telephone number. Some service providers charge separately for this, some require a monthly subscription for the number and different rates may apply depending on whether you have a non-geographic number (with an 0870 prefix, for example) or a geographic number from a specific exchange. You may also be able to choose any exchange in the country, with some providers even offering international numbers.

Costs vary considerably, and it's advisable to do a fair amount of research, so check out our table of VoIP services on page 102 for sample costs and calling rates.

## Sip devices

In terms of Sip-compatible hardware and software, you're spoilt for choice, with pros and cons to each of the products available.

You can, for example, simply plug a headset or USB phone into your PC and use that – just as with Skype or MSN Messenger. The version of Messenger bundled with Windows, for instance, can use Sip to connect to most of the compatible services in our table (see page 102).

It's also possible to download other Sip-enabled softphones, such as the popular

X-Lite application, originally from [www.xten.com](http://www.xten.com) but now widely available from a huge range of sites. And there are plenty of alternatives – some free, some chargeable – from other developers and VoIP service providers.

A softphone does tie you to using a PC, so a lot of consumer providers bundle a Sip telephone adapter as part of their services. Similar adapters are also available separately and connect directly to your broadband modem or router at one end (via USB or Ethernet), with an ordinary BT phone socket at the other. Plug a standard corded or Dect wireless phone into this and, with a few limitations, you can make and receive VoIP calls as if it was plugged into a landline.

So-called IP phones are yet another option, combining a telephone handset and Sip-enabled VoIP adapter. However, as with adapters, setting one of these up can be difficult, unless the service provider has specific instructions for the model you're using. Plus they can be quite expensive, especially if you go for a wireless handset, such as the ZyXel Wifi Phone with its built-in wireless Ethernet interface at £150.

You can also get broadband routers that have VoIP facilities built in, with sockets for one or more analogue handsets. Draytek was one of the first to offer such routers, but most of the other suppliers now sell them, with some service providers offering a bundled router as part of their VoIP solutions.

## What they don't tell you

Finally, there are one or two things to bear in mind with any VoIP solution, no matter who it's from or how it works. So, to round off, here's a short list of things to look out for.

### Really free calls?

VoIP services may be marketed with the promise of free calls, but this usually only applies to calls to other VoIP users, and some operators (BT included) charge even for that. You may also want to check that you can call free to other VoIP networks; it ought to be possible, but few providers make it easy and some don't allow it at all.

### PSTN rates

Calls to ordinary PSTN subscribers are nearly always charged for, either directly or as part of a calling plan. Rates are, typically, a lot lower than for a conventional landline, but free calls are rare and you may have to sign up to a premium-rate number to get them. Check, too, on the cost of calling a mobile, as this can vary a lot. Also, watch out for

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## Is VoIP right for you?

Think very hard if you're planning to use VoIP to replace your landline.

First you need some kind of Internet connection to take advantage of VoIP, and for most of us that means a phone line. The alternatives are cable or a wireless Internet service but, even then, there are reasons you may not want to ditch the landline altogether.

Ordinary phones (apart from cordless Dect models), for example, draw power from the landline, but if the power fails your PC softphone, analogue adapter, VoIP router or IP phone simply won't work. If you need to make emergency (999) calls, this could be a matter of life or death. Some adapters and routers now have a fallback circuitry to overcome this problem, but they're fairly rare and it does add to the cost.

Notice too that with a lot of the VoIP providers you're simply not allowed to dial 999. And with some, you may even be barred from dialling directory enquiries, 0800 and a range of other numbers as well.



Some routers now have VoIP technology built-in – all you have to do is attach one or more ordinary analogue phones to the sockets provided

VAT: some providers also charge this on pre-pay topups, plus VAT on your calls.

### Incoming calls

Most VoIP services let you have a number to receive ordinary PSTN calls. Some let you choose the exchange you want, enabling you to have a virtual number that could be anywhere, whereas others give you a non-geographic number, usually with an 0870 or 0845 prefix. Calls to geographic numbers are charged at the national rate, but if you have an 0870 or 0845 number, higher rates apply.

### Routers and firewalls

Most technical problems with Sip and VoIP in general occur when you're protected by a network address translation (Nat) router or firewall. Common symptoms are the lack of a dial tone or one-way connections, where you can be heard but can't hear what the other person is saying. There are ways around these issues, but you'll need technical support from the service provider and/or equipment vendor to resolve them.



# INTERNET PHONE SERVICES

## VoIP services

		VOIP STANDARDS	SETUP	CHARGES	HARDWARE INCLUDED	SUPPORT FOR THIRD-PARTY VOIP HARDWARE	SOFTPHONE	CALLS TO PSTN	CALLS FROM PSTN	PSTN NUMBER OPTIONS
AQL	<a href="http://aql.com/telecoms">http://aql.com/telecoms</a>	Sip	Free	£4.50/mth + call charges	Optional	✓	✓	✓	✓	Free - 0870, £4.50 geographic
Babble	<a href="http://www.babble.net">www.babble.net</a>	Sip	Free	PAYG or £5/mth for 1,000 mins	Optional	✓	✓	✓	✓	£10 - 0207 or 0870
BT Broadband Talk	<a href="http://www.btbroadbandvoice.com">www.btbroadbandvoice.com</a>	MGCP/Sip	Free	£2.99/mth + call charges	Analogue adapter	✗	✗	✓	✓	Free - 05 number
Callserve.com	<a href="http://www.callserve-communications.com">www.callserve-communications.com</a>	Sip	Free	PAYG	✗	✗	✓	✓	✗	N/A
Draytel	<a href="http://www.draytel.org">www.draytel.org</a>	Sip	Free	PAYG	Optional	✓	✗	✓	✓	Free - geographic
EasyVoIP	<a href="http://www.easy-dial.com">www.easy-dial.com</a>	Sip	£25 advance call credit	PAYG	✗	✓	✓	✓	✓	£25/year - London number
Freedom2Surf	<a href="http://www.freedom2surf.net">www.freedom2surf.net</a>	Sip	Free as part of broadband package	PAYG	Optional router	✓	✓	✓	✓	Free - 0845
Freetalk	<a href="http://www.freetalk.co.uk">www.freetalk.co.uk</a>	Sip	£19 for adapter <sup>(2)</sup>	£6.99/mth + call charges	Analogue adapter	✗	✗	✓	✓	Free - geographic, extra virtual UK nos £2.99/mth
Global Village	<a href="http://www.globalvillage.com">www.globalvillage.com</a>	Sip	Free	PAYG	Zoom router or phone adapter	✗	✗	✓	✓	Free - 0870
Gossiptel	<a href="http://www.gossiptel.co.uk">www.gossiptel.co.uk</a>	Sip	Free	PAYG or £9.99/mth for 600 mins	Optional	✓	✓	✓	✓	Free - 0870
Gradwell	<a href="http://www.gradwell.com">www.gradwell.com</a>	Sip	Free	Free for 3mths then £4/mth + call charges	Optional	✓	✗	✓	✓	Free - geographic
IPspeak	<a href="http://www.ipspeak.net">www.ipspeak.net</a>	Not specified	£50	PAYG	USB handset for PC connection	✗	✗	✓	✗	N/A
Lixtalk	<a href="http://www.lixxus.co.uk">www.lixxus.co.uk</a>	Sip	£15.99 inc VAT	£9.99/mth inc VAT	Optional	✓	Note (2)	✓	✗	Free - geographic
MSN Messenger	<a href="http://www.msn.co.uk">www.msn.co.uk</a>	Proprietary	Free	Free	✗	✗	✓	✗	✗	N/A
Nildram VoIP	<a href="http://www.nildram.net">www.nildram.net</a>	Sip	Free	PAYG	✗	✓	✓	✓	✓	Free - 0870
Pipecall	<a href="http://www.legend.co.uk">www.legend.co.uk</a>	Sip	£14.99	£2.99/mth + call charges	Optional	✓	✓	✓	✓	Free - 0845
Plustalk	<a href="http://www.plus.net">www.plus.net</a>	Sip	Free as part of broadband package	PAYG	Optional	✓	✓	✓	✓	Free - 0845
The Internet Phone Company	<a href="http://www.internetphoneco.com">www.internetphoneco.com</a>	Sip	Free	From £4/mth per PSTN number + call charges	Optional	✓	✓	✓	✓	£4/mth - 0845, £6/mth geographic
Sip2go	<a href="http://www.sip2go.com">www.sip2go.com</a>	Sip	£19.99 activation fee	PAYG or calling plans from £9.99/mth	Analogue adapter	✓	✓	✓	✓	Free +87810 global personal number
Sipgate	<a href="http://www.sipgate.co.uk">www.sipgate.co.uk</a>	Sip	Free	PAYG	Optional	✓	✗	✓	✓	Free - geographic
Sip Pal	<a href="http://www.sippal.com">www.sippal.com</a>	Sip	Free	PAYG	Optional	✓	✓	✓	✓	Free - geographic
Skype	<a href="http://www.skype.com">www.skype.com</a>	Proprietary	Free	PAYG	✗	✓	✓	✓ (Skype-out)	See note (4)	Free with Skype-in - geographic
Tesco	<a href="http://www.tescointernetphone.com">www.tescointernetphone.com</a>	Sip	£19.97 inc VAT from Tesco (inc £5 call credit)	PAYG	USB phone	✗	✓	✓	✓	Free - non-geographic
Vivotalk	<a href="http://www.intervivo.net">www.intervivo.net</a>	Sip	Free	From £4/mth per PSTN number + call charges	Optional	✓	✓	✓	✓	£4/mth - 0845, £6/mth geographic
Voipcheap	<a href="http://www.voipcheap.co.uk">www.voipcheap.co.uk</a>	Proprietary	Free	PAYG	✗	✗	✓	✓	✓	Free
Voipfone	<a href="http://www.voipfone.co.uk">www.voipfone.co.uk</a>	Sip	Free	PAYG	Optional	✓	✓	✓	✓	Free - 0560
Voipgate	<a href="http://www.voipgate.com">www.voipgate.com</a>	Sip/IAX	Free	PAYG	✗	✓	✓	✓	Note (5)	Geographic (with VoIP-In package)
Voiptalk	<a href="http://www.voiptalk.org">www.voiptalk.org</a>	Sip	Free	PAYG or calling plans from £2.99/mth	Optional	✓	✓	✓	✓	Free 0870 - Free geographic numbers with calling plans
Voipuser	<a href="http://www.voipuser.org">www.voipuser.org</a>	Sip	Free	Free	✗	✓	✗	✓	✓	Choice of local, national and mobile rate numbers
Vonage	<a href="http://www.vonage.co.uk">www.vonage.co.uk</a>	Sip	£16 activation fee	£9.99/mth + call charges	Analogue adapter	✓	Optional	✓	✓	Free - geographic, worldwide virtual numbers £2.99/mth
Wanadoo Wireless & Talk	<a href="http://www.wanadoo.co.uk">www.wanadoo.co.uk</a>	Sip	Free as part of broadband package	Free 6 mths, then £4/mth + call charges	Wireless router	✗	✗	✓	✓	Free - 0845
Yahoo Messenger with Voice	<a href="http://www.yahoo.com">www.yahoo.com</a>	Proprietary	Free	PAYG	✗	✗	✓	✓	✓	\$2.49/mth - geographic
Yahoo Messenger with BT Communicator	<a href="http://www.yahoo.co.uk">www.yahoo.co.uk</a>	Proprietary /Sip	Free	PAYG	✗	✗	✓	✓	✗	N/A

Notes: All prices ex VAT except where indicated; (1) Mobile rates may vary depending on network/time of call; (2) Free with annual subscription of £79.99 inc VAT; (3) Standard BT Together rates apply;

			TYPICAL CALL COSTS (PER MIN)					
	VOICEMAIL	SMS	VOIP CALLS	UK LANDLINE - PEAK	UK LANDLINE - OFF PEAK (EVE/WKEND)	UK MOBILE (1)	USA	COMMENTS
	✓	✗	Free	2.5p	1p (eve)	Network dependent from 7.9p	2.5p	
	✓	✓	Free	1p	1p	11.5p	1p	
	✓	✗	3p (daytime) eve/wkend free up to 1hr	3p	Free (up to 1hr)	Network/time dependent 3.61p-24.01p	1.25p	Discounts for BT Broadband customers. Optional Anytime plan (£7.99/mth) for free national calls anytime.
	✗	✗	Free	3p	3p	15p	3p	Outgoing calls from custom softphone only. Rates apply globally no matter where calling from.
	✓	✗	Free	1.4p	1.4p	14p	1.4p	Lower tariffs apply when £20 credit purchased.
	✓	✗	Free	0.95p	0.95p	9.9p-15p	0.95p	
	✗	✗	Free	2.7p	5p/hour	3.2p-19.4p	3p	Only available with Freedom2Surf broadband packages.
	✓	✗	Free	Unlimited free calls	Unlimited free calls	15p (day), 10p (eve), 5p (wkend)	2p	
	✓	✗	Free	1.5p	1.5p	14.5p	2p	Only available to buyers of Zoom VoIP hardware.
	✓	✗	Free	2.5p	1p (eve)	15p (day), 10p (eve), 6p (wkend)	2.5p	Lower tariffs with pre-paid calling plans.
	✗	✗	Free	1.25p	1.25p	12p	1.5	
	✗	✗	Free	2.2p	2.2p	15.2p	2.2p	Can only receive calls from other IPSpeak users.
	✓	✓	Free	Free	Free	7p-12p	1.5p	
	✗	✓	Free	N/A	N/A	N/A	N/A	PSTN gateway expected to be available later in 2006.
	✓	✗	Free	2.5p	1p	6p-20p	2.5p	
	✓	✗	Free	1.25p	0.6p	7.4p-11.8p	0.75p	Inclusive calling plans also available.
	✓	✗	Free	1.5p	1p	6p-20p	2.5p	Only available with Plusnet broadband packages.
	✓	✗	Free	1.72p	1.18p	7.05p-16.45p	1.77p	
	✓	✗	Free	1p	1p	14p	1p	
	✓	✗	Free	1.19p	1.19p	9.9p	1.5p	
	✗	✗	Free	1.3p	1.3p	6p-25.5p	2p	
	€15/year (free with Skype-in)	✗	Free	1.2p	1.2p	16.5p	1.2p	
	✓	✗	Free	2p	2p	10p (25p Hutchinsonson 3G)	2p	Calls earn Tesco Clubcard points. Registration pack from Tesco store required.
	✓	✗	Free	1.72p	1.18p	7.05p-16.45p	1.77p	
	✗	✗	Free	Free	Free	9.75p	Free	Software in beta format at time of compilation. Sip-compatible. Sipdiscount service also available.
	✓	✗	Free	1.1p	1.1p	9.5p-19.5p	1.1p	Call rates include VAT.
	✓	✗	Free	1.8p	1.8p	12p	1.8p	Support for video calls. Apple Mac, Pocket PC and Linux clients.
	✓	✓	Free	1.4p	1.4p	12.5p	1.4p	
	✓	✗	Free	Free (see comments)	Free (see comments)	Free (see comments)	Free (see comments)	Community-funded VoIP service. Incoming calls to PSTN numbers fund outgoing call costs. Restrictions apply.
	✓	✗	Free	Unlimited free calls	Unlimited free calls	15p (day), 10p (eve), 5p (wkend)	2p	
	✓	✗	Free	2.5p	Free	10p	4p	Only available as part of Wanadoo broadband packages.
	✓	✓	Free	1.5cents	1.5cents	17cents	1cent	
	✓	✓	Free (PC-to-PC)	See note (3)	See note (3)	See note (3)	1.25p	In the UK Yahoo has partnered with BT to offer voice services (Yahoo Messenger with BT Communicator).

(4) Optional (Skype-in - €30 (£20.72)/year); (5) Optional VoIP-in package - €5 (£3.45)/mth. PAYG = Pay as you go (some providers may charge VAT on topups); PSTN = Public Switched telephone Network

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# Office evolution

*The new version of the office productivity suite has already been creating a stir even though it's still in beta testing. Tim Nott takes an in-depth tour to see what all the fuss is about*

**A**lthough this first beta version of Microsoft's new office productivity suite bears the name Office 12, it looks as if the final version will be officially named Office 2007. Microsoft has stated that it will be released to manufacturing by the end of this year, with the 'public' beta 2 available by June 2006. As ever, there will be various versions, and US pricing has already been announced. Starting at the bottom, there will be a \$149 (£86 approx) Home and Student edition rising through \$399 and \$499 (£230 and £288) for Standard and Professional. For volume licensing there will be Professional Plus and Enterprise editions, which will variously incorporate Sharepoint Server, Microsoft Communicator (for instant messaging) and Groove mobile synchronisation.

Though we're used to regular Office upgrades, this one is very different. The current menu and toolbar interface has been with us since the first release of Office, back in 1993, and even longer in the standalone versions of Word and Excel.

Now Microsoft reckons Office has outgrown that interface. The first version of Word had around 100 commands, all easily accessible from the menus. Word 2003 has over 1,500, many of which – in Microsoft's words – 'are difficult to find'. The other big shock is a change in file formats – again the doc, xls and ppt binary files have been with us for many years. So get ready for docx,xlsx and pptx – we go into the details of these on page 108.

At the beta 1 stage, it's still very early days, so not everything you read about here may make it to release, and other features may be added – including, we hope, abundant transitional counselling. But we're betting that the file formats and the interface transformation are here to stay.

## Word

Starting with Word, which is probably the module most used by PCW readers, the new interface comes as something of a shock.



Although the File menu is relatively unchanged, you'll find that you can 'pin' recent documents to the list so they stay put.

You'll also find a button for Word options (see screen 1). The tabbed dialogue, which at 11 pages in Office 2003 was getting rather unwieldy, has been replaced by a simpler two-paneled view. You won't see all the previous options there unless you tick the 'Display Legacy and advanced settings' box, but the developers have rationalised things, incorporating the Customise, Add-ins, Document Protection and other option sets in the same space.

Digging around the File menu reveals a new feature throughout the suite – publishing to pdf. This is a catch-up exercise, as Star Office, Wordperfect and Ability Office already have this capability. Going further along the portable document path, Microsoft's open-standard XPS export is also included.

Moving on from the File menu, across the top of the window, there are the familiar Save, Undo and repeat buttons. You might wonder why there are buttons on a menu bar (and we'll come back to this) but the fun really

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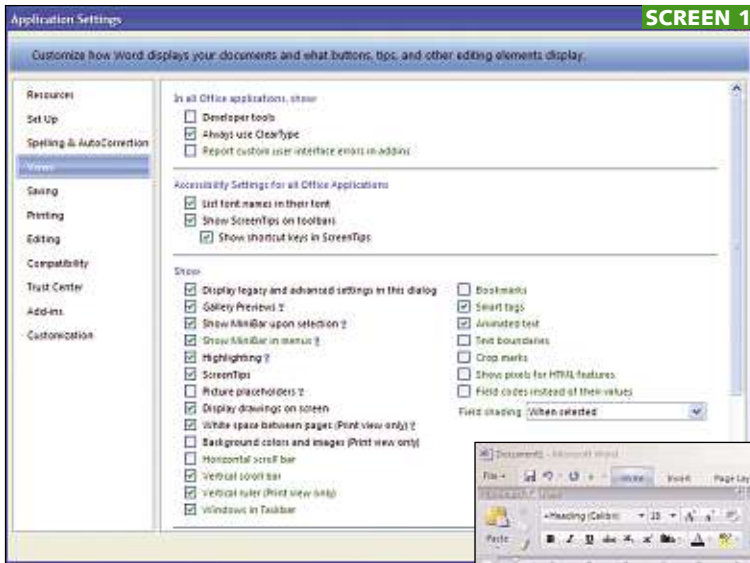
starts with what appears to be a whole new set of menus – Write, Insert, Page Layout, Reference, Mailings, Review and Add-ins.

These are not menus – at least, not as we know them. What they do is act like tabs to change the contents of the toolbar area below, known as the Ribbon. With the Write item selected, you'll see below areas dedicated to the clipboard, character formatting, paragraph formatting, 'Quick Formatting' and search/replace.

Once you're over the initial shock it all starts to make sense. Most of the buttons and list boxes have the familiar appearance of previous versions, and the Tooltips now offer more detailed explanations about what the buttons do.

Quick Formatting is what we've always known as Styles, but the designers have made rather more of the possibilities. For a start, they are displayed in a 'Gallery' giving thumbnail previews of the format. As you mouse over the contents of a gallery, the selected text changes to give a preview of the formatting or other effect. Click, and confirm the choice.

This live preview, which is also seen in



SCREEN 1

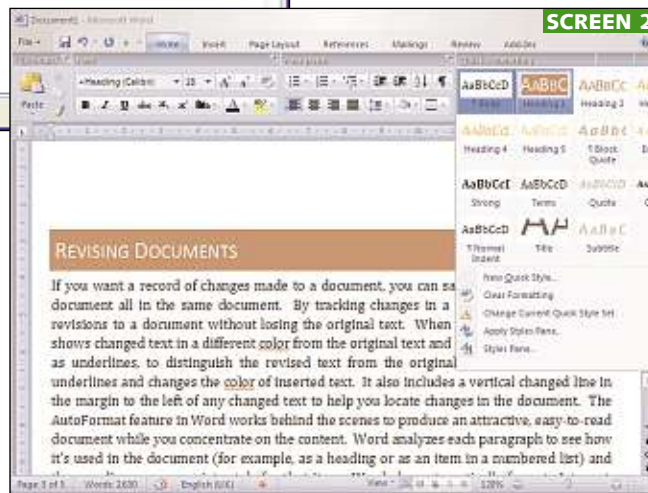
Left: Office options find a new home

things such as font lists, makes it easy to see some of the lesser-known Quick Formatting options, such as creating pull quotes or box-outs (see screen 2).

Quick Formatting also ties up with some new features on the Page Layout and Insert ribbons. Going to the former, you'll see the expected settings for margins, paper size and so on, as well as sections that deal with paragraph settings and graphics placement. The treasure, however, is found at the left of the ribbon – Themes – again presented in a gallery. A theme combines fonts, colours and graphic effects and can be applied to a document globally, rather than having to format piecemeal (see screen 3).

We've seen a similar feature in Microsoft Publisher's colour and font schemes. The current theme will be reflected in the font list – themed fonts appear at the top – and in the Quick Formatting gallery. With any theme selected, you can swap sets of Quick Formats with several variations of 'subtle', 'moderate' or 'intense' formatting.

Moving on to the Insert ribbon, you'll find dates, symbols, pictures



SCREEN 2

## 'Office's current plethora of dialogues are divided into modal and non-modal'

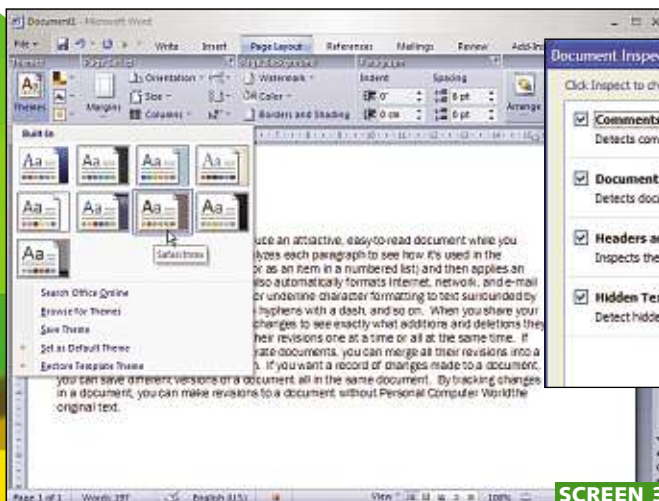
and bookmarks. Page numbering has been given a gallery of its own, including numbers in triangular accents at the top, bottom or centre of the page – again these keep pace with changes to the theme and the Quick Format set. If you want to add graphics embellishments to page numbers in previous versions, it is possible, but takes patience and know-how.

The Insert ribbon also hosts refugees from other former menus – headers, footers and tables – which seems logical enough. Footnotes, indexes and tables of contents are now found in the References ribbon, which again seems sensible, and section breaks seem to have vanished altogether. Finally there are some newcomers, such as IGX graphics and Document Parts. We'll be looking at the former in the Powerpoint section, and the latter corresponds roughly with Autotext but, as with Quick Formatting, the designers have given it a boost.

As well as Autotext, Document Parts encompasses fields and document properties as 'Building Blocks'. This has two main advantages. For administrators it makes it easier to enforce practices such as having the document title and author shown at specified places – stick the appropriate building block in the template and this will happen automatically. Second, this makes far more of the fact that Autotext entries can include

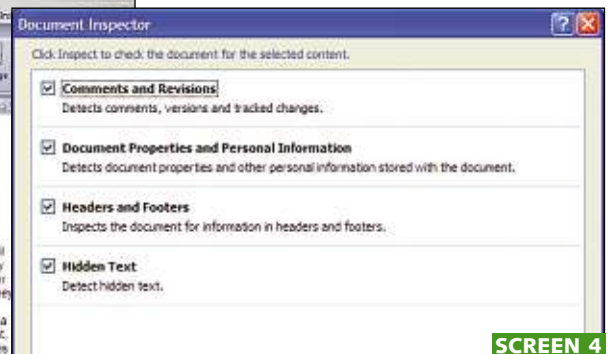
formatted text and graphics – the gallery approach makes this visible and easier to use.

Office's current plethora of dialogues are divided into modal – which you have to close before you can continue editing, such as the Word 'Insert date' or the Excel 'Insert function' – and non-modal, such as the 'Find and replace' dialogue. The new interface is far less modal, in that you can continue writing or editing with any section of the Ribbon active. Seasoned Office users will be used to controls that automatically appear when you need them – and often when you don't – such as the headers and footers, revisions and drawing toolbars. This version extends and focuses that behaviour. Other



SCREEN 3

Left: Themes help co-ordinate document appearance

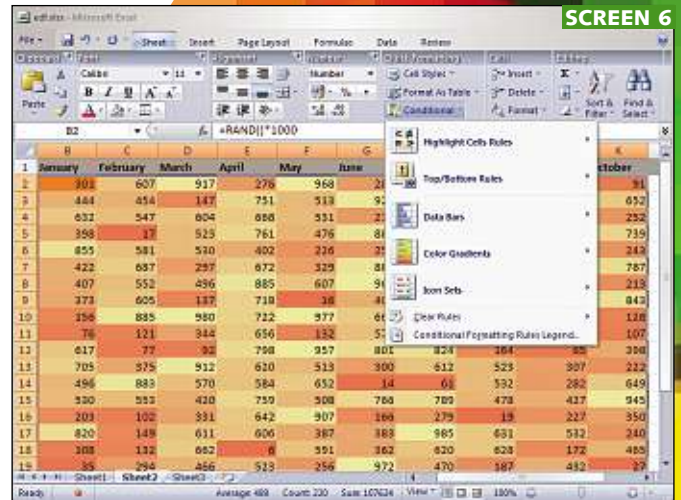


SCREEN 4

Above: The Inspector digs out hidden information



SCREEN 5



SCREEN 6

**Above: Chart ribbons replace multiple dialogues**

**Right: Conditional formatting made easy**

ribbons automatically appear when you create or select a table or a graphic, for example, offering all the tools you need to format that object. There's also a ghostly miniature formatting bar (the Minibar) that appears by the pointer whenever you select some text – move the pointer over it and it firms up to offer some basic formatting choices, such as font, alignment and emphasis. This works rather better than it sounds, saving the effort of mousing up to the ribbon, while being unobtrusive enough in its faded state to avoid distracting the user.

The Word status bar has been shuffled around a little to accommodate the view buttons that were formerly tucked – rather awkwardly – into the horizontal scroll bar. It has also been simplified by the removal of some of the more obscure elements such as the line and column numbers, though you can get these back from an almost invisible customisation button. There is, instead a useful running word count, a View menu to show or hide elements such as the ruler or document map, and a slider-style zoom control.

There's much more that we don't have room to examine, but a mention must go to the Document Inspector. The spectre of hidden data – such as annotations – being present in a final file is a perennial security headache. An add-in from Microsoft is available for Office 2003 that goes part of the way to rectify this, but the new Inspector checks for 'hidden or inappropriate data' in four categories – comments and revisions, hidden text, document properties and headers and footers (see screen 4).

## Excel

In Excel the default ribbon tab is Sheet, where you do most of the entering, editing,

formatting and sorting. Insert and Page Layout are similar to their Word counterparts. Formulas contains the function library, cell naming, auditing and calculation options. Data encompasses advanced sorting and filtering, as well as importing and managing connections to external sources; and Review, as with Word, includes proofing, comments and changes.

Excel has expanded – the former limits of 256 columns and 65,536 rows in a sheet have been upped to 16,000 and 1,000,000. Charting has been made easier and more versatile by virtue of having its own

## 'The Inspector checks for "hidden or inappropriate data" in four categories'

context-sensitive ribbon, rather than having to dig through various dialogues (see screen 5), and the Excel chart engine can be used suite-wide, although in practice we found the beta version somewhat unpredictable.

Conditional formatting has become much easier and more useful as a result. Say you have a table of figures and you want to highlight the highest in yellow, the mid-range in orange, and the lowest in red (see screen 6).

In Excel 2003 this means setting three rules. In the new version it's a Quick Formatting option – you can use gradients, data bars or icon sets to shade cells with a few clicks. Finally, at long last there is a Wysiwyg page layout view to complement the standard view and the awkward page break view.

**Outlook hasn't changed much, apart from the addition of a 'To do' pane**

YYePG Proudly Presents, Thx for Support

## Outlook

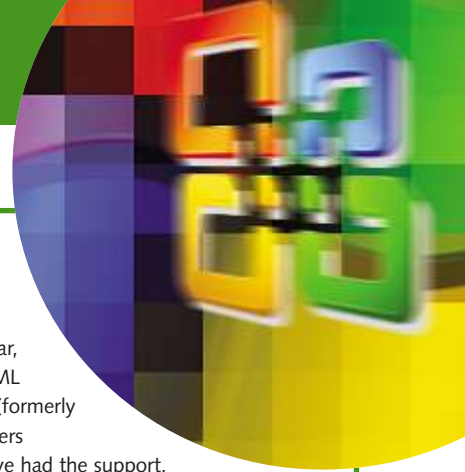
Outlook is little changed in appearance, but it did get a very thorough makeover in Office 2003. You do, however, get ribbons in the new mail and appointment windows for writing and inserting attachments, graphics or links. The message and calendar views are much the same as in Office 2003, but there is a newcomer in the shape of a 'To do' bar that summarises items from the Task list and appointments from the Calendar.

It will also accommodate items from other members of the Office family, such as Sharepoint, One Note and Project. To compensate for the space this takes up, you can shrink the Navigation Pane to tiles rather than the big buttons of 2003 (see screen 7).

Searching has been improved – you now get the search result highlighted and can specify other search criteria without having to delve into a separate dialogue. And sharing calendars has been made easier – organisations using Exchange or Sharepoint can send requests to co-workers to view their calendars directly. Others can send a snapshot of their calendar as an email.



SCREEN 7



# New file formats explained

So what are these new file formats we mentioned in the introduction, why have they been changed and what can we do about it? Microsoft is careful to describe them as open, royalty-free standards, and they are based on the industry-standard XML and zip technologies. XML stands for Extensible Markup Language. Just as HTML contains tags relating to the formatting and display of content, XML can contain custom tags, defined in a schema, which can, for example, relate to products or business activities. The zip side results in smaller files – how much smaller depends on the content.

In a brief experiment, we found that a single-page xlsx spreadsheet was 30 per cent smaller than its xls counterpart and an 87-page Word docx (with no graphics) shrank by 93 per cent. Impressive though this is, we found it didn't match the savings of zipping the plain doc and xls files. Microsoft claims the new formats will be more robust – it will be easier to recover data from damaged files – will improve data management and 'interoperability with line-of-business systems'.

However, despite being an open standard (unlike the previous Office binary files), the Office XML file format is not the same as the Opendocument format, which is based on the XML format created by

Openoffice.org. In December last year, Microsoft handed over the Office XML specification to ECMA International (formerly the European Computer Manufacturers Association) for ratification. This move had the support, among others, of Intel, Apple, Toshiba and the British Library. However, Opendocument has already been ratified by Oasis (the Organisation for the Advancement of Structured Information Standards) and has the backing of Adobe, Sun, IBM, Apple, Red Hat, Oracle, Novell and several US Library associations.

So, are there any reasons to panic? Despite the rivalry between the two XML file formats, the main issue for existing Office users will be that of compatibility with previous versions. Users of Office 2000, XP and 2003 have been promised a 'simple update', which will enable them to open, edit and save documents in Office XML formats. This leaves Office 97 and earlier users out in the cold, but this user base probably isn't too concerned about embracing state-of-the-art technology. It will still be possible to save Office 2007 files in legacy doc, xls and ppt formats – and even make this the default behaviour – so users of older versions won't be completely cut off.

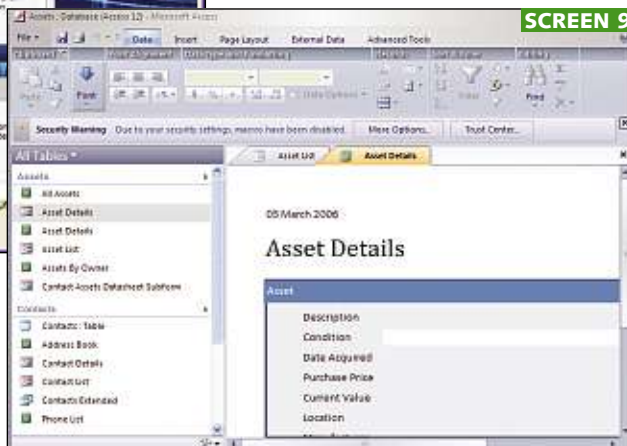


Left: Office 12 offers seamless online template browsing

## Powerpoint

Fairly predictably, Powerpoint has ribbons for Slides, Design, Animations and Slide show, as well as the common Insert and Review. A newcomer to the insertions options, as mentioned earlier, is the IGX graphic. This is a much-improved version of the Office 2003 diagram feature – from a single gallery, you can choose flowcharts, hierarchical schemes, cycles and relationships. The colours of IGX graphics are linked to themes, giving instant harmony with a presentation or document colour scheme.

Unlike Word and Excel, where users can be assumed to know the basics of getting down words and numbers, creating slideshows requires either some artistic talent or a helping hand in the form of design templates. Microsoft has made access to Office Online templates far more seamless – you can access these directly from the 'New' dialogue without having to open a browser or explicitly download a file (see screen 8).



Below: Neater tabbed windows are an improvement in Access

## Access

For those going for the Pro or higher versions of Office, Access again shows the integration of online resources – instead of the blank start-up screen, you are taken straight to the choice of opening an existing database or using an online 'tracking' template such as asset management or customer calls.

It's also been made easier to copy selected data from Excel tables with 'schemas' being created automatically, so on both these counts Access loses some of its 'high priests only' reputation. As well as the ribbons changing with different activities and views, the main workspace has been tidied up. The Navigation Pane can be customised and open

objects, such as tables or queries, are tabbed together rather than using the rather chaotic free-range window approach of previous versions. Form design has been made more intuitive with interactive feedback and it's easy to upload reports to a Sharepoint list (see screen 9).

## What does it mean for me?

Microsoft has always stressed the opportunities for customisation in Office, but this has now been curtailed at user level. Although the various sections of the ribbons look as if they can be moved around, they can't. Remember we said that we'd be coming back to those three buttons next to the file menu? This is the Quick Access Toolbar, and this is the only place that you can add or remove commands. And if you're

wondering what had happened to macros, then you need to enable the Developer Tools in Options. This will give all applications a Developer tab, providing access to macros, ActiveX controls, XML schema and custom document properties.

Having recovered from the initial shock, we've grown to like the new interface. The ribbons and galleries are certainly a far more elegant and effective innovation than Microsoft's last interface offering, the waste-of-pixels Task Pane. It's certainly easier to do many things, and existing possibilities have been brought out into the open. And, to add to the elegance, there's even a new set of typefaces. **PCW**



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# Rise of the robots

*Robots have always fascinated people and, thanks to cheap technology, robotics is no longer the preserve of men in white coats. Mark Whitehorn explains*



robot. You, robot. We should all robot. Why? Well, we could tell you that it is educational, and we will tell you it is an idea that has finally reached its time, but the main reason is simply that it's fun, and now, more than ever before, is the time to become a robot hobbyist.

Robots have fascinated us since Fritz Lang's Maria first danced for us in 1927 in the film *Metropolis*. Then they were an impossible dream – it wasn't just the technology that was missing, think about the materials. That was an era when not only engine blocks but also pistons were still being made from cast iron.

Constructing even a basic humanoid robot has required advances in many different areas – digital processing, memory, gyroscopic stabilisers, tiny motors, metallurgy, plastics, batteries, carbon fibre – the list is almost endless. The good news is that we are finally on the cusp of the robot age and, as with every major technological advance, from the aircraft to the PC, that cusp period is a wonderful time for hobbyists.

Of course, those advances can be used to build a whole range of robots from cute baby dinosaurs with personalities, through robots that can drive 130 miles through the Nevada desert, to the full-on android.

The fastest way to get started building your own is with a kit.

Many of the robots you can build are programmable, and for this you can typically use a PC, some software and a USB port. Obviously you need

programming skills but, some argue, robotics is the best way of learning programming.

## Where do you start?

Even easier than a kit, you can simply walk out and buy yourself a robot. There is the

Pleo, a baby *Camarasaurus*, can express emotions and perform 'lifelike' actions such as sneezing

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Robosapien, for example, that sells for about £50. It's programmable with up to 84 program steps and no computer is required; all you need is the remote control.

Robosapien V2 is distinctly different. For a start, at over 60cm tall it is almost twice the size of the previous incarnation. It also offers autonomous behaviour and the ability to interact with, and control, other Robonetics products such as Roboraptor. The bad news is that the price has also increased in stature – prices range from £160 to £200.

If you want something a little fiercer, there's the Roboraptor. It isn't programmable in the same way, although it has 40-odd pre-programmed functions and can be driven using the hand controller or allowed to roam free. For about £70 you can start your own dinosaur dynasty.

A bit too fierce? Then what about Pleo?

He's a one-week old *Camarasaurus* from the Jurassic period. According to the website, Pleo is 'The world's first life form', which is a bit of a blow for us humans, but I suppose we'll have to learn to live with it. Further information includes the fact that: 'Pleo will let you know how he feels at any moment. That's because he is capable of actual emotions including joy, aggression, sorrow, and fear. He can also yawn, sigh, sniff, snuffle, snore, cough, hiccup and sneeze.' To be frank, this may not be a



great selling point. We've all seen *Jurassic Park*; we know what happens when a dinosaur sneezes.

However, this guy does look very cute and will be available in the autumn for about \$200 (£115 approx). He isn't programmable but will have an 'upgradeable life form OS and personality system'. That could be useful for some humans we know.

Looking for something a bit more complex and expensive? Then consider the Robonova-1. He costs about £590, is programmable and can 'walk, run, punch, kick and do many acrobatic moves'. He's from Hitec Robotics, which produces a wide range of optional components for the Robonova. The Japanese also produce some excellent humanoid robot kits such as the £770 Kondo KHR-1, available from Robosavvy.

### Robot kits

Of course, adventurous *PCW* readers may well prefer something they can build and really program. No-one is suggesting your first robot will be as humanoid as Gort from *The day the earth stood still* (but it may be worth memorising the phrase 'Klaatu barada nikto' just in case); much simpler, smaller robots can be huge fun. Let's start with the obvious one, Mindstorms from Lego.

Lego announced Mindstorms in 1998. It was a truly innovative mix of the classic construction kit, with central CPU, servo motors and programming capabilities. Fast forward to 2006 and the most recent incarnation is Mindstorms Robotic Invention System 2.0 (RIS). It's great, it's fantastic and Lego's PR company doesn't want us to tell you about it. Why not? Well, there's a new version coming out called Mindstorms NXT, and very few retailers are still carrying RIS. OK, so why don't I tell you all about NXT? Because you won't be able to buy it until autumn 2006. The bottom line is that there appears to be a strange Mindstorms black hole at present. Having said that, the available information about NXT does suggest that it will be very good.

The heart of Mindstorms has always been the Intelligent Brick, essentially a Lego brick with processing power. The new one for NXT has a 32bit microprocessor. There are four input ports and three output ports, USB2 and Bluetooth, three interactive servo motors, rotation sensors, an ultrasonic sensor... the list goes on and on.

In software terms, there will be an icon-based drag-and-drop environment for creating programs, and the kit will include



Lego's Mindstorms is a clever, innovative kit, with a new version expected in autumn 2006

can be controlled from a PC. As an example, one intrepid soul is building a flight simulator for an F15. Sounds tame? This guy has a real F15 cockpit and is using Phidgets to control all the instruments ([www.f15sim.com/index.html](http://www.f15sim.com/index.html)). Is it a robot? Not really, but it is an excellent demonstration of what can be done with Phidgets.

### Robot wars

Then there are the serious robots that are being developed by commercial companies. Honda's Asimo is very impressive. It can walk, talk, run, climb stairs, recognise people's faces and voices, carry drinks and so on. Check out [www.asimo.honda.com](http://www.asimo.honda.com) for information including film clips. Sadly you can't buy one yet; Asimo is a development project. Interestingly, Sony beat Honda in the race to produce a running robot by demonstrating Qrio in December 2003. It also produced a saleable but expensive product in Aibo the robotic dog.

Sadly Sony has recently shut down its entire robotics division to refocus on its core business such as music, film and entertainment. Product development for Aibo and Qrio has already shut down and production has now ceased.

## 'Many of the robots you can build are programmable with a PC'

'18 robot challenges with step-by-step building instructions to acclimate beginners to the process of building and programming robots'. Sounds like a huge load of fun for a price in the order of \$250 (£144 approx).

Also well worth your consideration are Phidgets. As the website says: 'Phidgets are an easy-to-use set of building blocks for low-cost sensing and control from your PC. Using the Universal Serial Bus (USB) as the basis for all Phidgets, the complexity is managed behind an easy-to-use and robust Application Programming Interface (API). Applications can be developed quickly in Visual Basic, VBA (Microsoft Access and Excel), Labview, Java, Delphi, C and C++.'

Visit the website and you find a cornucopia of components, documents, programming tips and so on. You can use Phidgets to build robots (and many people do) but they are also adaptable to build almost anything you can think of that

Sony produced Aibo, the popular robotic dog, but has since shut down its robotics division

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## 'You could be just the person the robotics world is looking for'

### Killer robot

We may have the technology, but we still don't know what the first commercially successful robot will look like or what it will do. There have been many flops, such as 'robotic' vacuum cleaners and so on. Several companies are desperately trying different designs and models, but none has come up with the definitive answer. The crucial point here is that we have the technology but lack a clear picture of the desired end result. In computing we would say that what is missing is the 'killer app'. In robotics, unsurprisingly, the term 'killer robot' has not found favour in

### Robot resources

[www.wowwee.com/robosapien/robot1/robomain.html](http://www.wowwee.com/robosapien/robot1/robomain.html)

Robosapien can be bought from Gadget Shop, Toys 'R' Us and amazon.co.uk

[www.roboraptoronline.com](http://www.roboraptoronline.com)

Roboraptor is available in Argos, Woolworths, Toys 'R' Us and Tesco

[www.ugobe.com/pleo/index.html](http://www.ugobe.com/pleo/index.html)

Pleo the robotic dinosaur

[www.hitecrobotics.com](http://www.hitecrobotics.com)

Hitec Robotics, the home of Robonova-1

[www.lynxmotion.com](http://www.lynxmotion.com)

Lynx Motion not only sells the Robonova-1, it also sells a selection of precision engineered robot kits and components. You can also find lots of general robotic information on the site.

[www.robotstore.com](http://www.robotstore.com)

Muscle wire and a host of other robot-related stuff

[www.phidgets.com](http://www.phidgets.com)

Everything you need to know about Phidgets

<http://mindstorms.lego.com>

Lego and Mindstorms NXT

<http://robosavvy.com>

UK site with online store selling several humanoid robot kits and with useful forums

marketing circles, but that is what we are talking about. Who knows – you could be just the person the robotics world is looking for.

### Education

Having children is a huge bonus if you want to get into robotics – they provide you with the perfect justification for spending the necessary money. You can argue that programming becomes much easier to understand if abstract instructions such as:

Forward 20;

Left 90;

Forward 50;

Right 90;

can immediately be translated into a real, tangible set of movements.

Building a robot together is a huge bonding experience for parent and child. The challenge of problem-solving together, the shared reward of goal achievement... OK, so we don't have any evidence for this, but it sounds perfectly plausible and there are excellent robot construction sets that are genuinely aimed at children.

### Living in a material world

It is easy to think about advances simply in terms of stronger, lighter, more corrosion-resistant materials. But some recent advances in materials verge on being technological advances as well. Just to give you a flavour, consider muscle wires.

As the name suggests, these are thin strands of metal, specifically a nickel-titanium alloy called Nitinol. This has many properties that are typical of a wire – for example, passing an electrical current through the wire causes it to heat up. However, Nitinol has an unusual additional property. At ambient temperature it is easily stretched, but at higher temperatures it forcefully returns to its original shape and length. Combine this with the resistance heating and you can see the reason for the name. You can use these wires to act just like human muscles. Muscle wire can only pull, not push, but the same is true of organic muscles, so all we have to do is to copy biological design and arrange muscles in antagonistic pairs.

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The Darpa race for robotic vehicles was won in 2005 by Stanley, a Volkswagen Touareg

The contraction is small (three to five per cent), but the force is reasonable. In addition, wires come in a variety of thicknesses and can be used in multiples if required.

We're not trying to tell you that muscle wire is the missing component robot builders have been seeking for years, we're simply suggesting they are small, light, low-power, long-life, direct linear action motors. This single innovation makes possible a host of robots (and other devices) that would be impossible otherwise. Now add in the new g-force detectors and the miniature gyro stabilisers, plus a mix of cheap processing power and very cost-effective memory, and you have the potential for some serious fun.

### Robot cars

In October 2005, a race was held by Darpa (Defense Advanced Research Projects Agency) for robot vehicles. The 130-mile course included tunnels and man-made obstacles and was laid out in the Mojave Desert, 40 miles south-west of Las Vegas on the Nevada-California border. The same race had been held in 2004, when all the vehicles had failed to complete the course. In 2005, out of 23 starters, four completed the course. The robots were allowed to use GPS, inertial navigation systems, cameras and lasers to guide themselves. The winner was a Volkswagen Touareg called Stanley, entered by Stanford University and sponsored by Intel.

### Get the bug

Robotics is fun, relatively cheap and very rewarding. It's very educational and you might just come up with the killer application for the next great phase of robot technology. So why are you still reading this article? Get onto the web and start building. **PCW**





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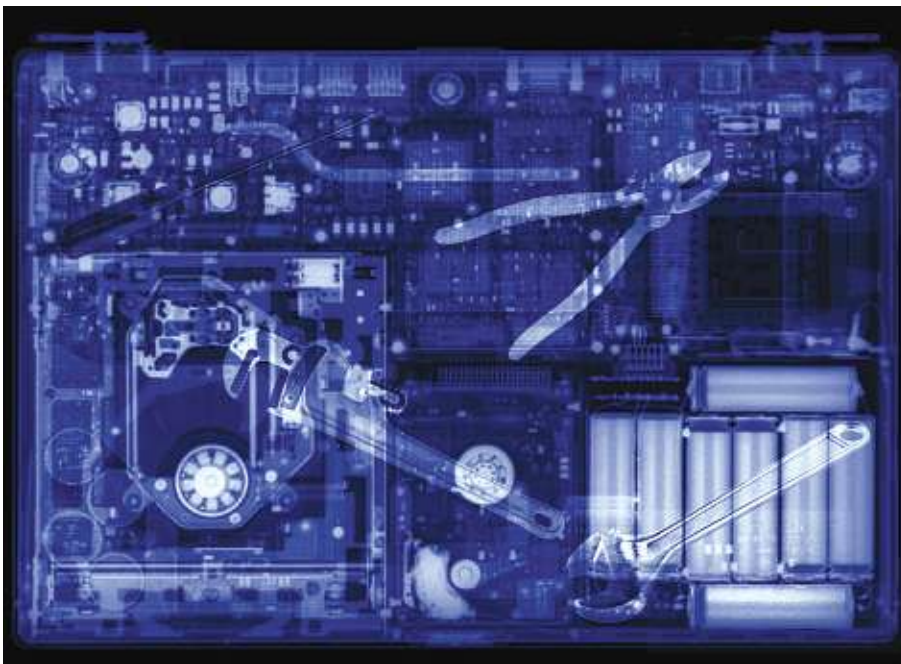
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# Hidden XP tools

*Windows XP offers far more functions than you'd guess from a quick glance at the Start menu. Hidden command-line programs are easy to start and have many useful features, as Thomas Wölfer and Heiko Mergard discover*



**Y**ou may not realise it, but you can start many of Windows XP Professional's extra functions, however well hidden, straight from a command prompt or the Run dialogue on the Start menu. The benefit is that this is often a lot quicker than a long series of mouse clicks in an almost impenetrable menu structure. You'll find a wide variety of free XP utilities on the XP setup CD and hidden away in the Windows/System32 directory. In this feature we'll give you a flavour of the most useful ones.

You can get a comprehensive overview of all the hidden applications on your system by using the operating system's Search feature on the Start menu. Enter \*.exe and \*.com as search strings and choose to search in the Windows directory and its subfolders. This will give you a clear listing of all the Microsoft utilities present on your computer. You might also find third-party applications here, depending on the programs you have installed. You can easily tell whether a particular program belongs to Microsoft by

looking at the description on the Explorer status bar when you highlight the file – alternatively, simply right-click on the file, choose Properties and click the Version tab. Many of the tools from the System32 folder have extra parameters (also known as switches). Detailed descriptions for many of the programs can be found in Windows XP's Help and Support Center.

## Character map – Charmap.exe

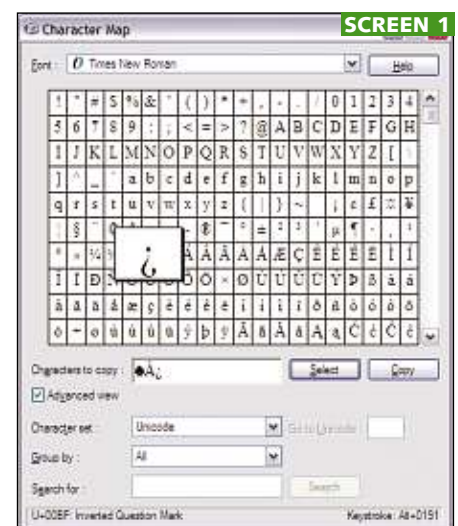
Character map displays all the characters in a particular font in a Windows program window (see screen 1). It is extremely useful when you're looking for a special character to insert in your text. The application allows you to select multiple characters to copy at the same time. Once you have found the character you are looking for, highlight it and click the Select button (or just double-click the character) to get it into the 'Characters to copy' box and then press the Copy button when you're ready. This puts the characters on the Windows clipboard ready for pasting into your application.

YYePG Proudly Presents, Thx for Support

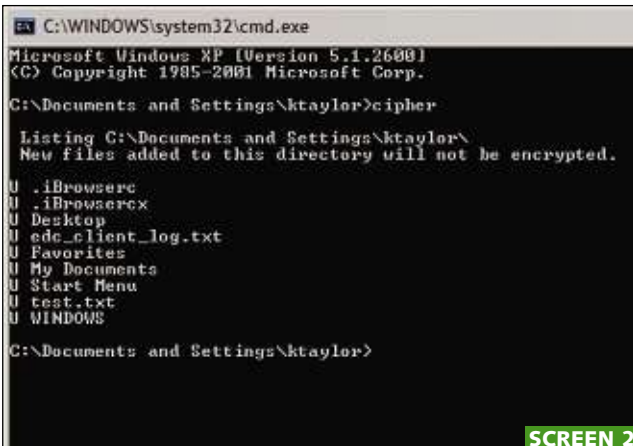
## Encryption tool – Cipher.exe

This utility detects whether files on an NTFS partition are encrypted with Windows' EFS (Encrypting File System) (see screen 2). You can also use it to encrypt and decrypt files or folders. If you encrypt a folder, any files that are subsequently added are automatically encrypted too. The encrypted files can only be read, copied or altered by their owner or an administrator. If you run the Cipher program without using any parameters, it just shows the encryption status of the files in the current directory: 'E' before the file name in the results means Encrypted, U means Unencrypted. If, for example, you want to securely encrypt all the folders in c:\secure, then type the command cipher /e c:\secure. Use the /u switch to decrypt them again.

Note that if you copy a file to a non-encrypted or Fat-formatted disk, folder or partition, the encryption could be lost. Also, if you try to restore encrypted files from a backup onto a different Windows installation, you won't be able to read the encrypted files unless you've backed up your private encryption key, as explained in the Microsoft article at <http://support.microsoft.com/default.aspx?scid=kb;EN-US;q241201>.



You can use Charmap to find special characters



SCREEN 2

## Disk clean-up – Cleanmgr.exe

Clean Manager is a tool for recovering hard disk space (see screen 3). It first calculates the amount of space you can claw back by deleting temporary files or compressing old files, then gives you the option of viewing the files affected and lets you choose more advanced options (on the 'More options' tab), such as removing Windows components and deleting restoration points. You always retain full control and you can specify the files to be deleted. In principle, you can safely remove all the suggested files. However, you should always retain the last system restore point just to be on the safe side.

## Compress files – Compact.exe

The Compact command compresses complete folders and individual files. Windows can use data compressed like this without having to decompress it first. If you enter the command without any parameters, it will show the compression status of every file in the current directory. If you want to compress a file, say, **c:\temp\test.dat** then enter the command **compact /c c:\temp\test.dat**. Setting the switch to /u will uncompress the file again.

## Character editor – Eudcedit.exe

The editing program for user-defined typographic characters, Eudcedit, is useful for designing your own custom characters, symbols, logos or even whole fonts (see screen 4). You can use it to make your own TrueType font with up to 6,400 custom characters.

It works like an icon editor. After choosing the character code, paint your symbol into the grid that's displayed automatically. If you are happy with the result, you can link (File / Font links) your user-defined symbol with one – or all – of the fonts installed on your computer in order to make it available for use.

## Event triggers – Eventtriggers.exe

Windows XP can allocate event triggers to almost any system procedure. If a process that you've decided to monitor has a certain outcome, the system can be set to trigger a user-defined task. Using Eventtriggers, you

can define, delete or view trigger events. For example, it is possible to monitor a Windows service and, in the event that it crashes or generates an error, to send a message to the administrator. Entering the command **eventtriggers** on its own displays a list of existing event triggers, or typing **eventtriggers /create /?** will give you online help on creating or deleting a triggered event. It's not a particularly simple tool to use and is really aimed at system administrators. For example, to create a trigger that monitors for an 'Error' event in the Windows System

## 'You can make your own TrueType font with up to 6,400 custom characters'

Event log and then run Disk Cleanup, use the following syntax at a command prompt:  
**Eventtriggers /Create /TR "Disk Clean-up" /L system /T error /TK c:\windows\system32\cleanmgr.exe**  
 (Key: ↵ code string continues)

You can find more advanced details at [www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/eventtriggers.mspx](http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/eventtriggers.mspx).

## Find strings – Findstr.exe

The command **findstr** (find strings) searches for character sequences within Ascii text files. It has a powerful pattern-matching syntax, so you can, for example, look for an occurrence of the combination of letters ABC followed by any character and the letter X, then print out the lines on which this expression occurs. If you simply want to look for the names of files that contain a particular string, you'll also find **findstr** useful.

To do this, there are various switches with which you can

Create your own symbols or even complete fonts with the Private Character Editor



SCREEN 3

Left: Quick and secure: you can use Cipher to encrypt and decrypt folders on NTFS partitions

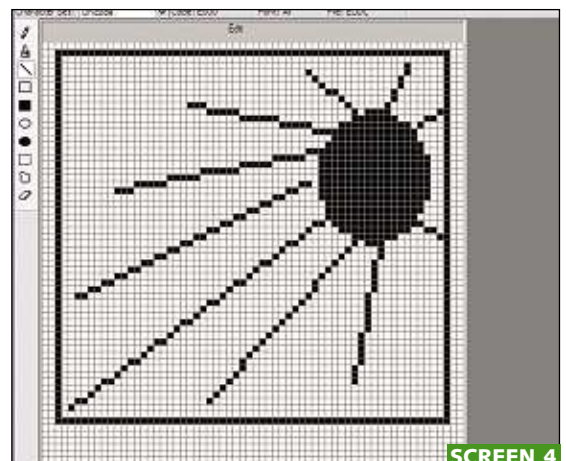
Right: Cleanmgr offers several clean-up options at once

control the search. For example, /s makes the search recursive; that is, it will search in all the files and sub-folders in a folder. You can use /i to turn off the differentiation between capital and small letters, and get a full syntax listing by typing **findstr /?** at a command prompt.

## Messaging – Msg.exe

The msg command allows you to send text messages to one or more users on the same network. If you want to send the message to a specific user, then you should also specify the name of the computer they are currently logged on to. The message text will appear in a dialogue box on the target computer's desktop, as long as the Messenger service is running on both PCs – note that this is not the instant-messaging application Windows Messenger, but a separate service.

For example, if you want to send a message to the user named Hubert on the computer called Riverside, type this command into the command prompt window:  
**msg hubert /SERVER:riverside**  
 Then type in the message text, which can be as long as you want. To mark the end of the text and stop entering text, press the Enter key, so the cursor goes to a new line. Then press the key combination Ctrl & Z and confirm this by pressing Enter again. After this, the message text is sent immediately to the recipient. PCW



SCREEN 4

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### NEW!! LaCie Safe Mobile Hard Drives

- Biometric encryption - Fingerprint recognition
- Safely store and transport your private data
- Ultra-portable - only 8 x13.8 x2.5cm & 200g
- USB 2.0 interface - all cables included
- AC adapter-free, powered by USB
- Sleek, robust enclosure - designed by F.A. Porsche
- 2 years manufacturer's warranty as standard

Available Models :  
40GB, 80GB, 120GB



### NEW! LaCie Triple Interface FireWire 800/400 & USB2.0 d2 Hard Drives

- Sleek, aluminium heat dissipating robust case
- 7200rpm ideal for DV Video - silent operation
- Fast FireWire 800 'Extreme' up to 88MB/s sustained
- FW 400, USB2.0 & FW800 (all cables included)
- Compatible with Windows® backup utility
- 2 years manufacturer's warranty as standard

Available Models :  
160GB, 250GB, 300GB, 500GB, 600GB,  
1000GB, 1200GB, 1600GB, 2000GB



### LaCie USB/FireWire 2.5" Mobile Drives

- Ultra-portable - only 7.6 x12.9 x1.7cm & 200g
- USB 2.0 and/or FireWire interface - cables included
- AC adapter-free, powered by USB or FireWire
- Ideal for notebook/laptop users as mobile storage
- Sleek, robust enclosure - design by F.A. Porsche
- Compatible with Windows® backup utility
- 2 years manufacturer's warranty as standard

Available Models :  
USB2.0 - 40GB, 60GB, 80GB, 100GB  
FireWire & USB2.0 - 40GB, 60GB, 80GB, 100GB



### LaCie 'Biggest Disk' FireWire 800 & USB2.0 RAID

- Up to 2000GB, RAID 0, 0+1, 5, 5+ hot spare
- Exceptionally high transfer rates of 80MB/s FW800
- Sturdy aluminium enclosure & ultra quiet operation
- Compact size - only 15.3 x29.8 x17.6cm
- Hot swappable hard disks; superior RAID security
- Automatic online rebuilding with RAID 5
- 2 years manufacturer's warranty as standard

Available Models :  
1000GB, 1600GB, 2000GB



### LaCie d2 'Lightscribe' Firewire or USB2.0 16x DVD+/-RW's & CD-RW

- Lightscribe direct disk labelling technology
- For professional looking created media
- Double Layer DVD up to 8.5GB capacity
- Dual format DVD+/-RW (and CD-RW)
- Super fast write and re-write speeds
- Bundles Include DVD authoring software
- 2 years manufacturer's warranty as standard

Available Models :  
DVD+/-RW 16x4x16x Double layer & CD-RW  
CD-RW 52x32x52x



### LaCie d2 'Ethernet Disk Mini' Network Hard Drives and USB2.0

- Share data across a network by unlimited users
- Easily administered via any web browser
- Quick and simple installation - no drives needed
- No server required, NAS hard drive
- Fast ethernet connection or USB direct attach
- For Windows®, Mac OS® and Linux
- 2 years manufacturer's warranty as standard

Available Models :  
'd2' mini NAS & USB2.0 - 250GB, 400GB, 500GB  
Ethernet Disk XP embedded - 800GB, 1000GB



### LaCie 100 Series Monitors

- Extremely high contrast ratio of up to 1000:1 (119 model)
- Wide viewing angles of 170° horizontally/vertically
- Premium MVA LCD panel
- Height-adjustable stand, tilt, swivel
- 3 years advance replacement warranty

Available Models :  
119 TFT/LCD Monitor - 19"  
120 TFT/LCD Monitor - 20"



### LaCie 300 Series Monitors

- DVI and VGA connectors
- Highest specification Superfine TFT Panel
- 321 - maximum resolution 1600x1200
- 321 - response time 20ms
- 321 - dot pitch 0.27
- 321 - 176 degree viewing angle (S-IPS)
- 3 years advance replacement warranty

Available Models :  
321 - 21"  
319 - 19"



### LaCie Blue Eye Pro Colour Calibrator

- Automatic hardware calibration
- Creates and activates advanced ICC profiling
- Time saver colour test module
- Switchable colourimetric environments
- Designed to complement the LaCie 300 series
- USB interface - all cables and software included
- 2 years manufacturer's warranty as standard

Available Models :  
Blue Eye Pro  
Blue Eye 2



## ORGANISE YOUR OFFICE

Welcome to the new *PCW* Business section, dedicated to the computing needs of readers running – or employed by – small and medium-sized companies. Here you'll find regular monthly features together with reviews of all the latest small-business hardware and software products. Everything from network switches and servers through to application software and office productivity tools.

In this, our first issue, the feature looks at small-business security and the various approaches and products available to keep your network safe from hackers, viruses and other common threats. More importantly, it discusses the benefits and limitations of the tools on offer, to enable companies with limited resources to get maximum value from their security investments.

That's followed by seven pages of hardware and software reviews, including a couple of the security products mentioned in the feature. But there's a lot more besides, and a great deal to follow in what will be a regular addition to your favourite PC magazine.

## CONTENTS

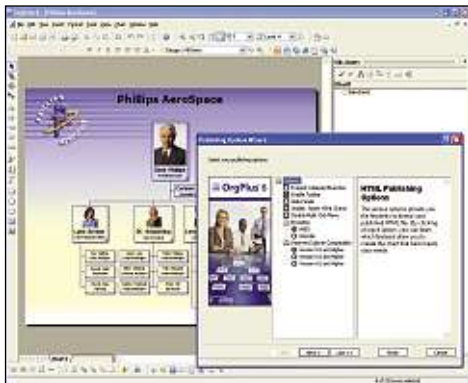
### FEATURE

**118** Safety first – a small-business security checklist to help keep your company network secure

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**126** Human Concepts Orgplus 6  
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 Log Me In IT Reach



Left: Human Concepts Orgplus 6  
 Above: Network Box SME 250

## OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

## OUR AWARDS

**Editor's Choice:** The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.

**Recommended:** A product that combines great features, usability and value for money.

**Great Value:** Not the best in class, but a product that has superior features and performance for the price.



Editor's Choice  
 Business



Recommended  
 Business



Great Value  
 Business

The business awards are used for products that are more suited to home offices or small businesses.  
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# BUSINESS



'With so many companies dependent on the net, hackers can do a lot more harm than any burglar'  
 Read our feature on page 118



# Safety first

Alan Stevens recommends a small business security checklist

**T**here was a time when all you needed to keep your business secure was a stout lock and a Rottweiler, but no more. With so many companies dependent on email and the Internet, hackers and virus writers can do a lot more harm than any burglar – perhaps even stop you doing business altogether.

Enough of the warnings – by now everyone must be aware of the need to take security seriously. But where should the small company start, and how do you decide which of the many products on offer is right for your business?

## The buck starts here

Starting is, in fact, quite easy, as most defences need to be concentrated where the local network connects to the Internet, a point at which a firewall of some kind is an absolute must.

Most Internet routers, for example, have a firewall built in and, if you have only a handful of users, that's probably all you need. Do go for a proper small-business product from companies such as Astaro, D-Link, Draytek and Netgear, rather than an unbranded box aimed at consumers. The price difference will be minimal (expect to pay £100 to £200 ex VAT), but you'll get a router with proper stateful inspection firewall, typically certified by a testing body such as the ICSA, plus big company backup and support.

Bear in mind that you'll be getting a basic level of security, as most firewalls work at the network level, blocking any unsolicited traffic unless specifically allowed. That means taking other precautions to protect against dangers such as viruses and spyware, transmitted in emails, downloads and other application-level data legitimately allowed through.

**Firewalls built into low-cost Internet routers are fine on a small network but can be a bottleneck and only provide basic protection**



A dedicated firewall such as the DFL-800 from D-Link will be needed on a large network

A firewall can also become a bottleneck, especially those incorporated into routers with limited processing power and connectivity options. On larger networks, therefore, you're better off choosing a dedicated firewall instead.

## Just firewalls

Dedicated firewalls come in several guises, the most popular being appliances, possibly with multiple Lan (local area network) and Wan (wide area network) ports, plus load balancing/failover facilities. Brands to look for here include D-Link, Fortinet, Netgear, Sonicwall and Watchguard, all of which offer affordable yet effective small-business firewalls.

Alternatively, you can get firewall software and configure an ordinary PC or server to filter your Internet traffic; for example, Microsoft's ISA Server 2003, Check Point's Firewall-1 or Smoothwall Guardian. However, even though software can work out cheaper (especially if you go down the Linux open-source route), an appliance is likely to be a lot easier to both configure and manage.

## VPN

Commonly built into the same hardware or software as a firewall, a VPN (virtual private network) server is rapidly becoming another must-have security tool. That's because it allows remote branch offices and mobile users to connect to the main office Lan across the Internet.

The technology here is quite complex but not that difficult to understand. VPN connections are secured by first encrypting the traffic involved, then encapsulating the data inside ordinary TCP/IP packets, creating so-called VPN 'tunnels'. These are difficult to intercept and, even then, the encryption scrambles the data making it of little value to anyone without the keys to decrypt it.

**Site-to-site VPN tunnelling is easy to configure, but VPN client software is needed to support individual users**

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Several different tunnelling protocols can be used, but the most common are PPTP (Point to Point Tunnelling Protocol) and IPSec (IP Security). Of the two, PPTP is the easiest to deploy and is supported by most small-business products, but the more complex IPSec technology does provide a higher level of security.

You also need to understand that VPN tunnels can be configured in two ways. One is between VPN servers on separate networks (site-to-site tunnelling). The other is to support individual remote users. VPN to remote users is much harder to manage, and requires client software to be deployed on end-user PCs.

In terms of actual products, it's possible to get Internet routers with VPN servers built in, although, as with firewalls, performance can be an issue. The number of simultaneous VPN tunnels supported by the router will give you a rough guide as to what it can handle, but also check the overall bandwidth supported. If performance looks like it's going to be an issue, opt for a dedicated firewall/VPN appliance or software instead.





If your mail server lacks its own security, a specialist appliance, such as the Barracuda Spam Firewall, could be the answer



A UTM (Unified Threat Management) solution, such as the ISS Proventia M10, could provide all the protection your network needs in a single box

## Anti-everything

After firewalls and VPN servers, the next big concern has to be protection against application-level threats. Problems such as viruses, trojans, worms, spyware, spam and other nasties are not usually blocked by the firewall.

There are a number of approaches you can take, and lots of different products to choose from. However, one of the most common questions asked is: should this type of protection be implemented on individual servers and desktops or, like a firewall, at the gateway where Lan meets Internet?

The answer depends on a number

of factors, such as the tools involved, the amount of expertise available and how your particular company works. Anti-virus protection, for example, can be implemented on specialist gateway appliances, but you still need to protect individual desktops, as viruses can be transmitted in lots of ways besides the Internet. The same also applies to anti-spam measures, especially if users are allowed to use Hotmail and other hosted email services. It's important, therefore, to prioritise, with network servers a good place to start.

If you're hosting your own email server, for example, then as a matter of course you should make sure it has both anti-virus and anti-spam filters. Fortunately most small-business mail servers now come with this functionality as standard, or at least facilities to plug in third-party protection. If not, look for tools that can be used regardless of the software involved, such as specialist email security appliances from companies such as Barracuda, Mail Frontier and Sophos, or consider switching to a different solution altogether.

Next make sure you have anti-virus software on all your desktops and notebooks and, more importantly still, make sure it's up to date. The best way of doing this is with a proper network solution, rather than relying on free desktop software included as standard by PC vendors. Leading anti-virus companies, such as McAfee, Sophos and Symantec all have this kind of product, making it possible to centrally download updates and keep client desktop systems protected with little or no intervention required.

You'll also need spyware protection, which should be at the Internet gateway to protect Lan users, and on individual desktops where users are allowed to take notebooks out of the office or connect to the Internet by other means. Microsoft has its own free product (Windows Defender) for desktop use, but there are plenty of alternatives that are just as effective, as well as lots of gateway appliances.

## The unified approach

Finally, an increasingly common trend is to combine some or all of the measures mentioned above. For example, many firewalls have anti-virus and anti-spam

functionality built in, while others add content filtering, intrusion detection and prevention (IDP) and other options to create so-called Unified Threat Management (UTM) solutions.

Lower cost, simpler deployment and centralised

**A proper network anti-virus solution will make sure all your desktops and servers have up-to-date protection**



management are the most obvious benefits of this approach. If the tools can be made to work together, a UTM solution ought to afford a higher level of protection, compared to deploying the individual components alone. For example, when a phishing email is received, anti-spam filters can stop it reaching the intended recipients while, at the same time, the firewall can be reconfigured to block other users trying to connect to the websites involved.

There are lots of UTM products to choose from, mostly implemented in the form of fit-and-forget appliances. However, feature sets differ as does the degree of integration between the tools provided, so ask lots of questions before making any decisions.

To help we have reviews of a couple of products capable of providing just this kind of 'joined up' security (see pages 120 and 121). One of these, the Network Box SME 250, comes as part of a managed security service, which is another alternative worth considering.

Indeed, if you're not confident of managing security yourself, or haven't the resources, then turning over all or part of the task to a specialist provider may be a better and, ultimately, more cost-effective approach. **PCW**

## Stay on top of patches

Keeping up to date with the latest Windows updates has to be a key part of any security strategy, but you don't want each and every user downloading and applying patches independently.

Fortunately Microsoft has a tool to help – Windows Server Update Services (WSUS) – which can be used to manage and distribute patches for Windows and a range of Microsoft applications, including Office, Exchange and SQL Server.

Available for free download ([www.microsoft.com/windowsserversystem/updateservices](http://www.microsoft.com/windowsserversystem/updateservices)), WSUS runs on a Windows server and retrieves patches from the same Windows Update service used by individual PCs. They can then be checked for compatibility before being made available for general distribution on the Lan.

Clients simply connect to the local update server rather than the Microsoft website, with the approved updates



**WSUS can be used to centrally download and distribute Microsoft updates on a small-business network**

retrieved and applied as normal. Limited to patches produced by Microsoft, WSUS is nevertheless a useful management tool with a browser-like interface and flexible scheduling options.

It's also very easy to use and something all companies, regardless of size, should consider using.

MANAGED SECURITY APPLIANCE

# Network Box SME 250

Get hassle-free protection from Internet threats



The Network Box SME 250 is updated, monitored and managed remotely by security experts

There are plenty of security appliances available to protect a small company network from hackers, viruses, spam and other Internet threats. However, it can be a struggle to find the time and expertise to keep them up to date and working effectively. So why not pay someone else to do all the hard work? For an annual fee, Network Box will supply the necessary appliance, pre-configured to suit your needs, and monitor and manage it for you.

There are several Network Box models to choose from, each running the same Linux-based software on hardware sized to suit the number of users involved. We tested the SME 250, which can cope with 50-75 users on up to three separate local networks, with the option of multiple Wan ports for additional load balancing and/or backup of the Internet connection, if required.

Installation can be a DIY job or carried out by a Network Box engineer, which is easier but does cost extra. In fact, the DIY option isn't that difficult with the appliance configured as a transparent bridge on most networks, so there are no changes to user PCs or network servers. Just a couple of tweaks are needed to any existing router or firewall setup.

In terms of functionality you get just about everything you could want in the one box, starting with a stateful inspection firewall and an integrated VPN (virtual private network) server. This can be used to connect branch offices together and support individual remote and mobile users, with help to configure clients also available if needed.

Network anti-virus protection is another standard feature, with a mix of Kaspersky, Clam AVG and Network Box scanners to filter viruses from all inbound and outbound traffic. Likewise, there's comprehensive

anti-spam filtering of emails, using a mix of technologies, plus Surf Control content filtering and IDP (intrusion detection and prevention) tools. All come ready configured as part of the managed service agreement, plus it's possible to monitor the appliance locally and change some of the settings yourself.

By typing the name of the appliance into a browser, we could quickly see how many viruses had been blocked in the past few days, the volume of spam traffic and so on. We could also drill down to get more detailed information and do things such as create custom spam blacklists, identify known safe senders and release messages mistakenly held in quarantine. Plus we were able to edit the rules used by Surf Control to filter content, although the interface here isn't as simple and most users would be advised to leave well alone

Indeed, apart from the odd look to see what had been blocked, we found we could leave the Network Box to get on with protecting our test network completely by itself. Any updates required were pushed out and applied automatically and, when we turned the unit off, we were quickly advised by phone and asked to switch it back on. There's also a 24-hour helpdesk should you need one-to-one assistance.

To check security, we downloaded dummy viruses, visited known spyware and other categorised sites, and pulled down mail using accounts with a known high spam content. All were blocked and filtered as expected and we were impressed with the level of protection.

Mobile workers still require separate desktop tools but, that apart, the Network Box appliance is a good choice for the hard-pressed small business, offering comprehensive network security with none of the hassle of a self-managed solution. *Alan Stevens*

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## Details

**Price** £5,875 (£5,000 ex VAT) for the first year, followed by an annual fee of £3,290 (£2,800 ex VAT)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Network Box  
 0800 107 6098  
[www.network-box.co.uk](http://www.network-box.co.uk)  
**Specifications** AMD Sempron processor • 768MB of Ram • 80GB hard disk • Four 10/100Mbps/sec Ethernet interfaces • Security-hardened Linux OS • 10,000 simultaneous VPN connections, 75Mbps/sec VPN throughput (3DES encryption) • Anti-virus: 22,000 emails/hour • Anti-spam: 15,000 emails/hour

## Verdict

**Pros** Set up and managed remotely by security specialists; updates pushed out and applied automatically; local monitoring and customisation facilities

**Cons** More expensive than a non-managed solution; can take a while to implement policy changes

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** Not cheap but a great choice for the small business with limited resources for managing network security

★★★★★

SECURITY APPLIANCE

# Zyxel Zywall 35 UTM

Broad-spectrum protection on a budget



Left: The Zywall 35 UTM is designed to protect a Lan against just about anything the Internet can throw at it

Above: Included as standard, the Zywall Turbo Card is a must if you want to use the anti-virus and intrusion-detection/prevention tools

The name says it all. Or rather it does when you know that the 'UTM' part of the Zywall 35 UTM stands for Unified Threat Management which, in this instance, means an appliance to protect a local area network (Lan) against just about anything the Internet can throw at it.

What you get is an intelligent, Asic-based (Application-Specific Integrated Circuit) switch with a set of six 10/100Mbps/sec Ethernet ports on the front of the rack-mountable unit. Two of these connect the appliance to the Internet, with automatic load balancing plus failover should problems arise. The others are for Lan attachment, although each can also be configured as DMZ (demilitarised zone) ports to protect public-facing servers.

A PC Card slot can also be used to add wireless networking. However, most buyers will opt for the Zywall Turbo Card instead, as this hardware acceleration adapter is included as standard and, without it, the anti-virus and intrusion detection/prevention options don't work.

There are no user limits on the Zywall 35 UTM, which can support up to 10,000 concurrent Internet connections. As such it can cope with networks of 50-100 users with ease, with other models available for smaller and larger networks. All offer the same set of services, starting with a stateful inspection firewall and a VPN (virtual private network) server.

The VPN server is IPSec based with DES/3DES or AES encryption, but it's site-to-site tunnelling only, which means a separate personal VPN server at the client end if you want to connect individual mobile users.

An anti-virus scanner based on Kaspersky technology is next up, along with a range of anti-spam tools including the ability to rate email against an

external spam database. Content filters based on Bluecoat technology can also be applied; and last, but by no means least, there's an intrusion detection and prevention (IDP) filter. This looks for and blocks unusual activity caused by trojans, spyware and other application-level infections, and can also filter instant messaging and peer-to-peer networking sessions.

Subscribe to the update services and the various filters involved will all be maintained automatically, and most can be used straight out of the box. However, no two networks are alike, and a degree of customisation will always be required. The usual graphical interface makes this fairly easy, but it's not for the fainthearted, and companies with limited expertise would be well advised to have it done for them.

As a gateway solution, the Zywall UTM can only protect users while they're connected to the Lan. That means separate desktop protection for remote and mobile workers with independent Internet access.

There's very little to go wrong in the appliance, which performed well in our tests blocking the dummy viruses and the spyware we tried to download. It also identified most of the spam sent to it, but the only action it can take is to either block suspect messages completely or mark them and let them through. Other products with local storage can quarantine suspect spam and viruses, and some even allow users to manage their own spam settings – an option not provided on the Zywall UTM.

However, this appliance does what the name implies, affording protection against a wide range of common Internet threats. Plus it's reasonably priced, although competition in this market is fierce and it's worth looking at others before deciding what to buy. *Alan Stevens*

YYePG Proudly Presents, Thx for Support

## Details

**Price** £586.33 (£499 ex VAT) (trial subscriptions to update services included) Annual subscriptions: £287.88 (£245 ex VAT) anti-virus; £233.82 (£199 ex VAT) content filtering; £164.50 (£140 ex VAT) anti-spam

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Zyxel Communications 01344 303 044 [www.zyxel.co.uk](http://www.zyxel.co.uk)

**Specifications** Two 10/100Mbps/sec Wan ports • Four 10/100Mbps/sec Lan ports • Zywall Turbo Card • Stateful inspection firewall • IPSec VPN server • Kaspersky anti-virus scanner • Anti-spam filters • Bluecoat content filter • Intrusion detection and prevention filter

## Verdict

**Pros** Protects from a range of threats; no user limits; automatic updates; Wan load balancing and failover; multiple DMZ ports

**Cons** No local quarantine facilities; anti-virus and IDP options require the Zywall Turbo card; technical expertise required to deploy; remote and mobile users need separate protection

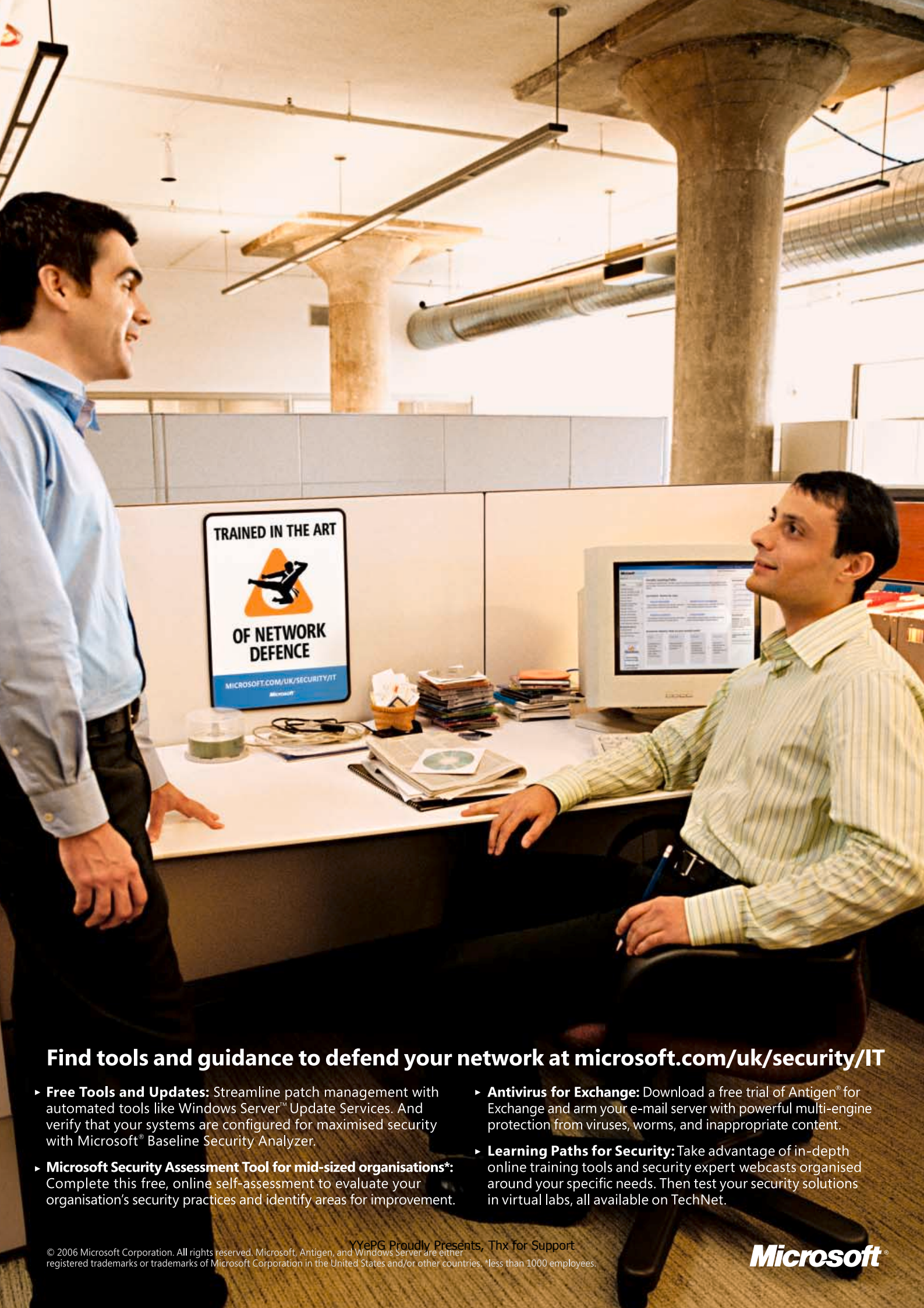
**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** Affordably priced, but not without its limitations

★★★★★



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## TAPE BACKUP DRIVE

# Tandberg 420LTO

Suitable for small businesses that are prepared to pay a premium



The Tandberg 420LTO fits into a standard half-height slot and can store up to 200GB of uncompressed data per cartridge

A common problem with small-business servers is lack of space for a tape drive with, often, just a single half-height bay to play with. Drives of that size tend to be limited in both performance and capacity, making backup labour intensive and time consuming. However, that isn't the case with the Tandberg 420LTO, which slips easily into a half-height slot and yet supports the popular LTO (Linear Tape Open) Ultrium recording format.

The Tandberg 420LTO is an LTO2 drive. Not quite state of the art, as LTO3 drives have been around for some time now, but good value at about half the price. Plus it can still cram a good 200GB of data onto each cartridge, rising to a theoretical maximum of 400GB if the claimed 2:1 compression ratio were to be achieved.

However, don't expect to get that figure, as a lot of files will be compressed already and of those that aren't few will be reduced by the full amount. Still, given the mix of data found on most file servers you can comfortably expect to get around 300GB per tape – about how much data you'll find on most small-business networks. And that means being able to fit a full backup onto a single cartridge while, if you want to handle more, autoloaders based on the Tandberg drive are also available.

On the performance front, the maximum transfer rate is a creditable 24Mbytes/sec, equivalent to 48Mbytes/sec when the 2:1 compression ratio is achieved. Again, you can't just take the figures at face value. The Ultra160 SCSI interface is more than fast enough (160Mbytes/sec), but the speed of the backup application can have a big impact, as

can the specification of the host server, especially the storage subsystem. Indeed, on an entry-level server, the speed at which data can be read from the hard disk is likely to be the main limiting factor – not the speed at which that data can be written to tape.

To give you an idea of what might be possible in practice, we installed the Tandberg drive into a typical small-business server equipped with a single Intel Xeon processor, 1GB of Ram and a 200GB Sata (Serial ATA) disk array. We then ran a backup using CA's Brightstor Arcserve 11 software – a process that took a little over two hours with this setup, at an average transfer rate of 26.25Mbytes/sec. Not as fast as with an LTO3 drive, but impressive nonetheless, especially given the relatively low price of the hardware. Similarly priced half-height DLT drives, for example, would take a lot longer and can fit a lot less data onto a cartridge, while the much cheaper DAT products are slower still and currently max out at 72GB per tape.

Cartridge prices vary, of course, depending on the vendor involved, but we found Imation branded tapes on offer at £27.03 (£23 ex VAT), which is about what you'd pay for alternative DLT cartridges, with the ability to store a lot more data on each one.

We tested a bare drive designed to fit inside a server, so you'll have to factor in the cost of cabling and backup software on top of the price given. However, an external drive with its own power supply is also available, plus we were able to find vendors offering bundles that include the software, cables and tape cartridges required.

Alan Stevens

YYePG Proudly Presents, Thx for Support

## Details

**Price** £1,086.86 (£924.99 ex VAT) – bare internal drive

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Tandberg Data

00 800 8263 2374

[www.tandberg.com](http://www.tandberg.com)

**Specifications** LTO Ultrium 2 tape drive • 200GB per cartridge (400GB compressed) • 24Mbytes/sec transfer rate (48Mbytes/sec compressed) • Ultra 160 SCSI LVD host interface • MTBF 250,000 hours at 100 per cent duty cycle • Head life 30,000 tape running hours • Internal and external drives available

## Verdict

**Pros** Fits a standard 5.25in half-height slot; 200GB native cartridge capacity; low-cost media compatible with other LTO Ultrium drives; supported by all the leading backup applications

**Cons** Price; don't expect to get the full 2:1 compression claimed

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** A compelling small-business backup solution, although you will pay a premium for these benefits

★★★★★

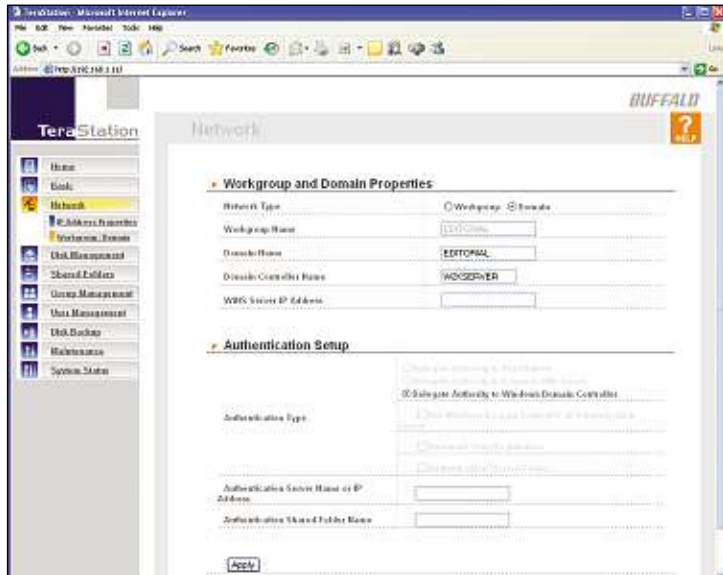
NETWORK-ATTACHED STORAGE

# Buffalo Terastation Pro

Advanced plug-and-go data storage that is simple to manage



It may be small, but the Buffalo Terastation Pro can hold up to 1TB or more of network data



You don't need to be a Linux expert to manage the Terastation Pro via the user-friendly browser GUI

It may look like a small server but Buffalo's Terastation Pro is a Network-Attached Storage (Nas) appliance, dedicated solely to sharing files on a small-business network. And, although it's Linux based with a state-of-the-art journaling file system, you don't need to be a Linux expert to use it, with everything configured and managed via a user-friendly browser interface.

The hardware is delivered ready to use. A Gigabit Ethernet port connects it to the network, while the disks are mounted on special carriers behind a lockable front door. A set of four 250GB Western Digital Sata-150 (Serial ATA) drives were installed on the model we looked at, giving a total of 1TB (terabyte), with a slightly smaller 0.6TB model also available (£430 ex VAT), along with a 1.6TB version at £1,000 ex VAT.

As delivered, the disks are configured as a single Raid 5 array which, on our test server, meant just 750GB of usable space. The remainder holds parity information, which enables lost data to be recovered automatically should a disk fail and have to be replaced. Despite being mounted on slide-in carriers, the disks can't be hotplugged, which means powering down the server to replace a faulty drive.

If you prefer, you can reconfigure the disks as two mirrored shares or, if space is an issue, as either a single 1TB or four separate 250GB volumes. However, some thought is called for before doing so as, although it's not difficult, 750GB is more than enough for most small networks and the Raid 5 protection is well worth keeping.

Deployment is simple. Plug the Terastation Pro into the network, switch it on and it boots in just under a minute with a small LCD status display to tell you

when it's ready. You can then run the Tera Navigator setup utility provided or use DHCP (Dynamic Host Configuration Protocol) to assign an IP address automatically. Either way, it's then a just matter of connecting via a browser and specifying the Windows workgroup or domain you want the Terastation Pro to join, then you're ready to go.

A public share is available straight away, which Windows users can browse to and configure as a mapped drive just like any other network resource. In addition it's possible to create custom shares and restrict access to files and folders to particular users or groups. Users, in turn, can be defined locally or authenticated against an external domain server, although there's no support for externally defined groups and no disk quota facilities.

You can also reconfigure and manage the array via the graphical user interface (GUI), and take backups either to another Terastation or USB-attached external disks, with facilities to schedule regular backups. There's UPS support for managed shutdown of the Terastation in the event of a power cut, and alerting facilities to let you know when attention is required.

A quiet fan is another benefit, but we would prefer the on-off switch to be behind the lockable disk door. As it is, anyone can power-down the appliance. A lack of expansion is another drawback, although if you run out of space you can add another Terastation Pro to the network. You can't run other applications on the Buffalo appliance or share printers with it.

Still, if network storage is all you need then none of that really matters, and with all that Raid-protected storage available, the Buffalo Terastation Pro is well worth a look.

Alan Stevens

YYePG Proudly Presents, Thx for Support

## Details

**Price** £646.25 (£550 ex VAT)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Buffalo Technology  
 01753 555 000  
[www.buffalo-technology.com](http://www.buffalo-technology.com)  
**Specifications** Freescale integrated host processor • Embedded Linux O/S • Four 250GB Western Digital Sata/150 hard disks • Raid 5 protection as standard • Optional mirroring, drive spanning and JBOD configurations • Single Gigabit Ethernet network interface • Two USB2 interfaces for external backup disks • SMB and FTP access supported

## Verdict

**Pros** Simple browser-based management; Raid 5 protection by default; built-in backup to another Terastation or external USB disk  
**Cons** Easily switched off; disks can't be hot-swapped; no support for USB tape drives for backup

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

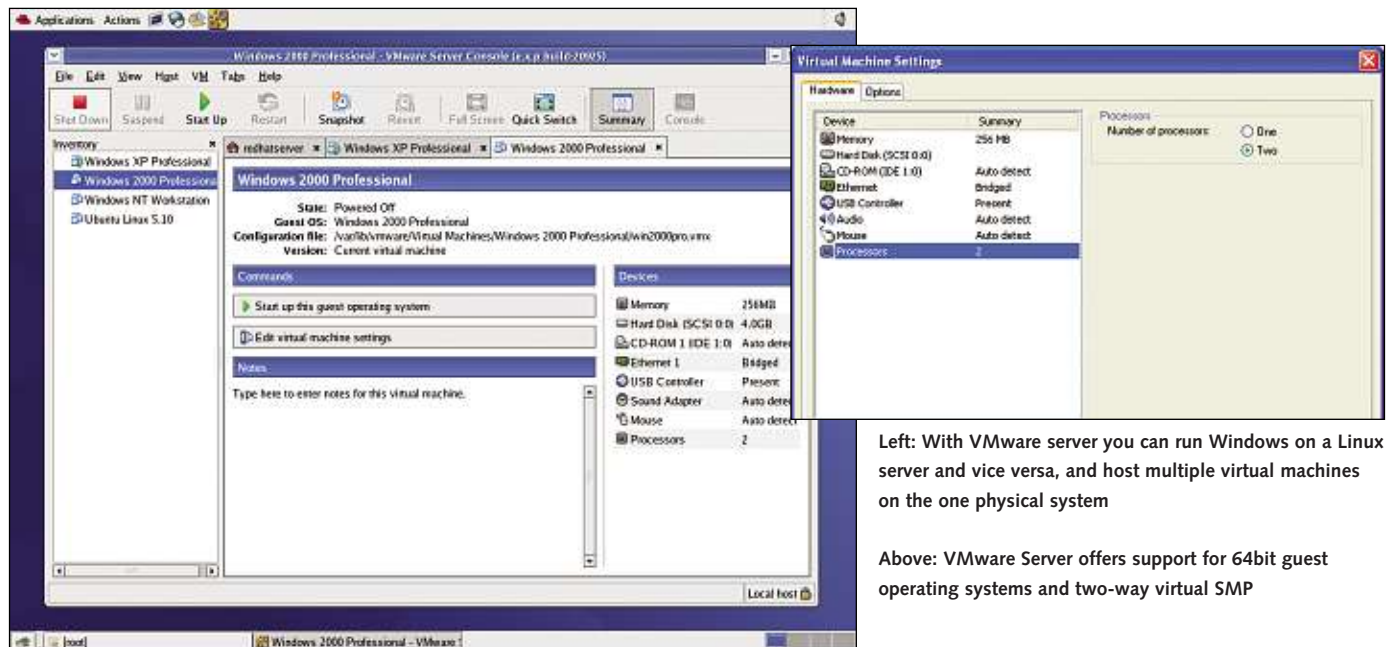
**Overall** Easy to manage and ideal for the small business wanting to avoid the hassle of a general-purpose file server

★★★★★

## SERVER VIRTUALISATION SOFTWARE

## VMware Server

Host multiple virtual machines with this impressive free download



Left: With VMware server you can run Windows on a Linux server and vice versa, and host multiple virtual machines on the one physical system

Above: VMware Server offers support for 64bit guest operating systems and two-way virtual SMP

Earlier this year, VMware announced a free version of its market-leading virtualisation software, designed to encourage smaller companies to discover what the technology has to offer. We downloaded the beta, renamed VMware Server, to see exactly what you get and how easy it is to use.

VMware Server runs as an application on a host server with two versions available – Windows and Linux – with identical functionality. Essentially, that's the ability to host multiple virtual machines (VMs), each with its own virtual processors, memory (up to 3.6GB per VM), hard disks, CD-Roms, network interfaces and so on. Each VM can then run its own guest operating system, which can be more or less any version of Windows, Linux or Solaris and any applications written for those platforms.

Installation is straightforward, particularly the Windows version, but it can be tricky on some of the more obscure Linux distributions. However, stick with one of the major commercial Linux packages (we loaded it onto a server running Red Hat Enterprise Linux AS 4.0) and you shouldn't have any problems.

The same VMware console can be used to manage either platform with, again, consoles for both Windows and Linux, which can either be run on the host server itself or remotely. Either way you start out by defining the virtual machines you want to run; from scratch, using the wizards provided, or by importing the single file used to hold an existing VM configuration.

Virtual machines are also started and stopped from the console, plus you get full remote access, as though sitting in front of a physical system. You can also take a snapshot of each VM setup, which can later be used to revert to the original settings, undoing any changes

made in the meantime – a real boon when deploying new applications and for system developers when debugging code.

We found it all remarkably easy to use and, although free, it is far from a cut-down version of VMware's virtualisation technology. Indeed, according to VMware, it can be used to run full production systems and not just for testing and development. It supports both 32bit and 64bit virtual machines (you'll need a 64bit processor for the latter) and two-way virtual SMP and is fully compatible with other VMware products.

It may sound a bit complicated and you might not think it worth bothering with for your business, but don't be put off. VMware Server is deceptively easy to master and, once you understand what it does, it's amazing how many uses you can find for it.

Companies looking to consolidate servers, for example, can get maximum benefit from new hardware while retaining the same web, email and other servers. It also lets you build custom virtual machines and (where licensing allows) deploy them as many times as you want – and in minutes rather than hours or days. Indeed, pre-built file and print, DNS, email and other virtual servers can be downloaded from the VMware website ready to just load and run. Plus it's a must for software developers to develop and test their applications, with none of the time, trouble and investment required using real systems.

Based on a tried and tested technology, VMware Server is a stable and eminently usable product, and should be released along with full commercial support by the middle of the year. We recommend you download and try it yourself – it doesn't cost anything and you won't be disappointed. *Alan Stevens*

YYePG Proudly Presents, Thx for Support

## Details

**Price** Free download

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** VMware 01276 414 300  
[www.vmware.com](http://www.vmware.com)

**System requirements** 32bit or 64bit server (64bit required for 64bit guests)

- Host operating system that can be Windows 2000 Server/Advanced Server, Windows Server 2003 (any edition) or Linux
- Guest operating systems can be any version of Windows, most implementations of Linux or Sun Solaris

## Verdict

**Pros** Allows multiple virtual machines to be run on the same physical server; support for Windows, Linux and Solaris guests; 64bit guest support; two-way virtual SMP; remote console access and management

**Cons** Installation on some Linux hosts can be tricky

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** Market-leading server virtualisation software for free – a winning combination with plenty of benefits for companies of all sizes

★★★★★



ORGANISATIONAL CHARTING

# Human Concepts Orgplus 6

A well-featured package that can be used for more than just drawing charts



Ask most people to produce a chart showing their company or departmental structure and they'll reach for Powerpoint or something similar. An alternative, however, is Orgplus 6 from Human Concepts, which makes charting easier and adds a raft of extra functionality including data import, flexible publishing and automation options.

Orgplus is an easy-to-install Windows desktop application. There's nothing out of the ordinary when it comes to the core drawing facilities; as you might

expect it's totally geared to building hierarchical charts, with the usual palette of tools to draw and link boxes, add labels, set backgrounds and so on. Photos and graphics can be added and there's a bundle of customisable templates that make it easy to produce very professional-looking documents.

With the Professional version we tested, you can import and match data for use in charts from a variety of sources; everything from flat .csv files through Excel spreadsheets to SQL databases and even SAP systems. You can also perform spreadsheet-like calculations on the data, choose how to display it and create and link to sub-charts and so on, to create phone lists, salary tables and other useful documents.

Charts can be printed and exported to Microsoft Word or Powerpoint and published as either HTML documents or pdfs. They can be distributed with the free Orgplus reader provided, or users can be given the Orgplus web plug-in to access charts via a browser.

There are also facilities to configure scheduled updates to chart data and publish charts automatically.

It can take a while to get to grips with some of the more advanced tools in Orgplus, but no special skills are required and it will find a place in any small business producing charts on a regular basis. *Alan Stevens*

## Details

**Price** From £229.13 (£195 ex VAT)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Human Concepts  
 01803 390 490 [www.orgplus.co.uk](http://www.orgplus.co.uk)  
**System requirements** Pentium-class CPU • Windows 98SE, NT4 (with SP3 or above), 2000, XP, Server 2003 • 64MB of Ram for Windows 98, 128MB for all others • 80MB of free disk space • 16bit graphics with 1,024 x 768 resolution

## Verdict

**Pros** Chart-drawing tools; data import options; choice of publishing methods; automation facilities  
**Cons** More advanced options take a while to get to grips with  
**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

**Overall** Great for producing organisational charts, with some useful extra features

★★★★★

## KVM SWITCH

# D-Link DKVM-8E

Good performance at an affordable price, enabling control of multiple servers



An eight-port KVM (keyboard, video and mouse) switch, the D-Link DKVM-8E is an affordable solution for companies looking to manage up to eight servers from a single console. No software is required and multiple switches can be daisy-chained to control up to 64 servers if required.

The D-Link switch is a very compact device that ships with an external power supply, although it can also pick up its power from the server keyboard interfaces, so this is only really needed when daisy-chaining. Rackmounting brackets are also included, as well as a starter pack of three cables: one for daisy-chaining and the other two for server attachment.

Additional cables cost £12.75 (£10.85 ex VAT) and, although there's only one length on offer (1.8m), that shouldn't be a problem with most rackmount setups. You can only get PS/2 connectors, but then

most servers still come with PS/2 ports, so that shouldn't be a problem either.

The cables are all attached at the rear with, on the front, a simple display to show the bank and port number being managed. Buttons alongside allow for manual selection, in addition to which you can use keyboard hot keys or an on-screen display (OSD) to select the target servers.

The OSD menu is very straightforward, with the computer to be controlled selected from a list. A degree of customisation is also possible. For example, we were able to give each port a user-friendly name and configure a password before the switch could be used.

Maximum supported screen resolution is 1,920 x 1,440, which is more than adequate for most servers, and you can hotplug without the need to restart the switch or reset the mouse, unlike some other budget products we've used. Performance is excellent with quick switching between different resolutions and refresh rates. Documentation is adequate and we encountered no problems at all using this very affordable yet workmanlike eight-port KVM product. *Alan Stevens*

## Details

**Price** £170.06 (£144.73 ex VAT)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** D-Link 020 8731 5555  
[www.dlink.co.uk](http://www.dlink.co.uk)  
**Specifications** Eight-port analogue KVM switch • Single console • Max resolution 1,920 x 1,440 • Independent daisy-chain interface • 6pin mini-Din (PS/2) keyboard and mouse connectors • 1.8m host cables (two included) • Push button or hotkey port selection • On-screen display

## Verdict

**Pros** Low price; up to eight switches can be daisy-chained; performance; simple management interface  
**Cons** Cable length; PS/2 cables only

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** Basic but affordable, it does the same job as others costing twice as much

★★★★★

## ACCOUNTANCY SOFTWARE

# MYOB Accounting Plus 15

Keep track of stock and payroll information with MYOB's latest update



**M**YOB Accounting Plus 15 is aimed at the small to medium-sized business that needs to keep track of stock and payroll as well as the normal day-to-day costs and income.

The opening interface has remained unchanged with a simple flowchart illustrating each part of the accounting process. This helps users understand what to do next, whatever their level of accounting knowledge. A to-do list keeps track of work in progress and includes shortcuts to the relevant window.

All the important reports are just a couple of clicks away in the Analysis menu and they can be used to

compare performance with the previous year or against the budgets set earlier in the year.

A total of 190 reports can be produced. There are plenty of ways to output reports to other applications including Excel, pdf and HTML.

A useful new feature is the ability to store transactions after a year end. They cannot be changed but can be used for performance comparison or budgeting.

Accounting Plus can also be used to keep track of the stock held by a company over several different sites.

One of the biggest stresses for growing companies is the employment of staff. As well as regular salaried staff, Accounting Plus can track staff paid by the hour, and uses this information for monthly payments.

Updates for tax tables from the Inland Revenue can be downloaded from the MYOB website. These are handled in an Internet browser, rather than within Accounting Plus, a method which could be improved.

More than one user at a time can access the accounts, each with their own password. You can also restrict the accounts a user can access, which is useful for keeping sensitive information, such as salaries, private.

With its proven track record, Accounting Plus 15 is a good choice for growing businesses that want to keep track of costs as well as maintain an audit trail. *Tim Smith*

## Details

**Price** £351.33 (£299 ex VAT)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** MYOB [www.myob.co.uk](http://www.myob.co.uk)  
**System requirements** Pentium 200MHz or Power Mac G3 • 32MB of Ram • 50MB hard disk • Windows 98/ME/2000/XP/NT4 or Mac OSX 10.1

## Verdict

**Pros** Impressive reporting capabilities; stock control  
**Cons** Updates performed in separate browser window

**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

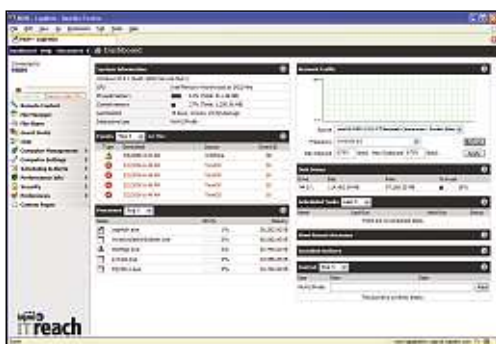
**Overall** Accounting Plus is a good choice for growing businesses that need a solid and secure accountancy package

★★★★★

## REMOTE-ACCESS SOFTWARE

# Log Me In IT Reach

Fast, easy control and support of remote PCs from anywhere with access to a web browser



**P**art of a range of Log Me In products, the IT Reach version takes the concept of web-based remote access and augments it with powerful management and support features that can save you huge amounts of time and effort by avoiding support calls and off-site visits.

The system works via an Internet gateway hosted at [www.logmein.com](http://www.logmein.com). Here you can set up an account and sign up for a free trial. Adding a new computer to your account provides you with an installation link that can be sent to a remote user via email. They click the link to install the client, which is then automatically

configured and added to your online list of remote computers for future sessions.

After connection you are presented with the Log Me In IT Reach Dashboard. This is a well thought-out hierarchical interface that provides fast, simple, interactive access to a hugely detailed selection of information and configuration settings on the remote system, as well as fast remote control and file-transfer capabilities.

The top-level menu shows you crucial system information such as hardware specifications, running processes, an event log summary and a list of installed Windows Hotfixes. You can also drill down much further, to reveal motherboard temperatures, installed applications, DLLs in use and much more. In many ways it's easier to diagnose and fix problems by using Log Me In IT Reach than it is sitting in front of the computer itself and far easier than trying to talk a remote user through dialogue boxes and menus.

Because the system uses 3am Labs' servers as an intermediary, firewalls are effectively circumvented for the duration of the remote session. Integrated security features include RSA encryption, IP filtering, denial of service (DoS) and authentication attack filters. *Paul Monckton*

YYePG Proudly Presents, Thx for Support



## Details

**Price** £47.65 (£40.55 ex VAT) per PC per year; volume discounts available.  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** 3am Labs [www.logmein.com](http://www.logmein.com)  
**System requirements** Target PC – Windows 98, 2000, XP, Server 2003 • Internet Explorer or Netscape 4.0 or later • Internet connection, Admin privileges • Local PC – any browser with an Internet browser and Java or ActiveX enabled • Internet connection • PDAs also supported

## Verdict

**Pros** Slick user interface; run from anywhere; fast remote control; comprehensive support tools  
**Cons** Requires Internet connection even for Lan-based PCs

**Features** ★★★★★  
**Ease of use** ★★★★★  
**Value for money** ★★★★★

**Overall** An excellent time-saving tool

★★★★★

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Your personal web address including E-mail	The All-inclusive packages for Beginners	Digital Lifestyle loaded with action	Complete package for advanced users
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<ul style="list-style-type: none"> <li>• 5 E-mail accounts</li> <li>• each with 1 GB E-mail storage</li> <li>• E-mail alias and forwarding</li> <li>• Anti-Spam &amp; Anti-Virus included</li> </ul>	1 GB web space/10 GB traffic <ul style="list-style-type: none"> <li>• 500 E-mail accounts (1 GB per account)</li> <li>• each with 1 GB E-mail storage</li> <li>• STRATO Communicator</li> <li>• Website builder STRATO LivePages</li> <li>• Anti-Spam &amp; Anti-Virus included</li> </ul>	3 GB web space/20 GB traffic <ul style="list-style-type: none"> <li>• 1,000 E-mail accounts (1 GB per account)</li> <li>• STRATO Communicator</li> <li>• Website builder STRATO LivePages</li> <li>• Anti-Spam &amp; Anti-Virus included</li> <li>• PHP, Perl, CGI, Python, Ruby</li> <li>• 3 MySQL databases</li> </ul>	4 GB web space/50 GB traffic <ul style="list-style-type: none"> <li>• 1,500 E-mail accounts (1 GB per account)</li> <li>• STRATO Communicator</li> <li>• Website builder STRATO LivePages</li> <li>• Anti-Spam &amp; Anti-Virus included</li> <li>• PHP, Perl, CGI, Python, Ruby Cron-Jobs, SSH Access</li> <li>• 9 MySQL databases and backup</li> </ul>
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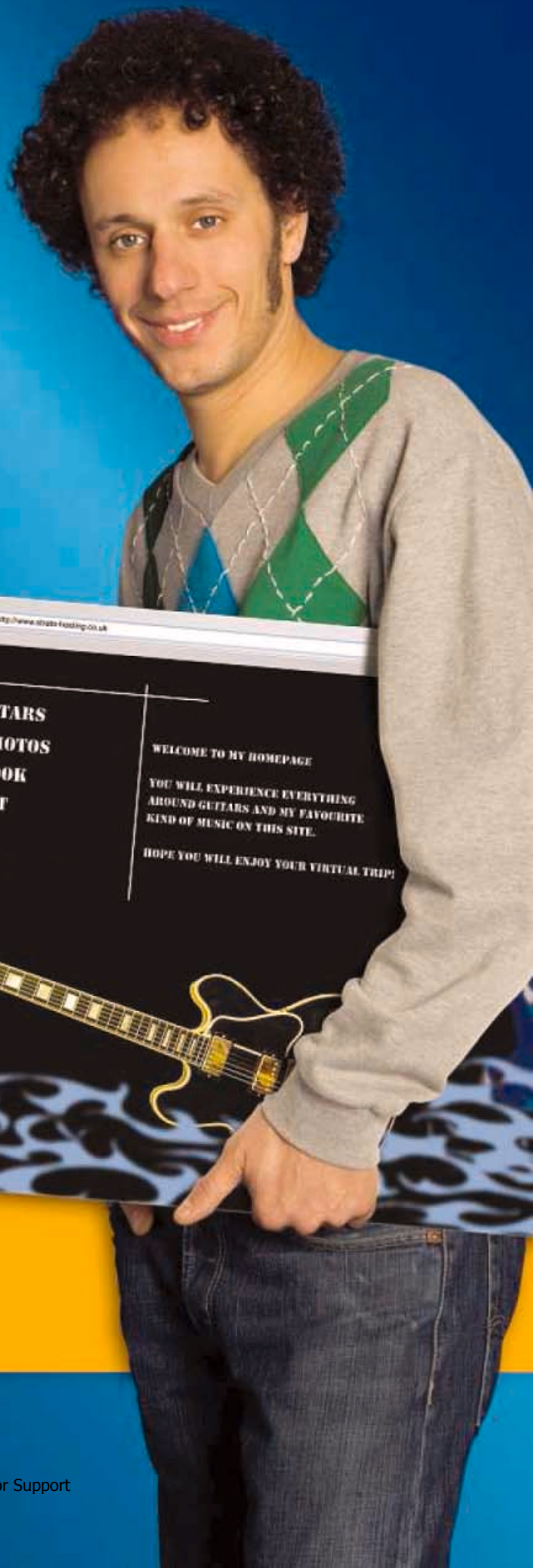
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## MORE PAGES, MORE HELP

Judging by the number of letters we receive, word processing ranks with spreadsheets as one of the topics you find most frustrating to get to grips with, which is hardly surprising, as it's a core reason many people buy a PC in the first place. So we're delighted to tell you that from now on, we've given our guru Tim Nott an extra page to play with – and he's wasted no time in using the additional space to give you a useful background on the Unicode standard and its foibles.

As another bonus, we've also expanded the Networks column this month to allow Alan Stevens to guide you through the process of setting up your own email server. It's not too difficult, so why not give it a try?

And of course, we have our usual selection of answers to your queries and problems in Question time. If you have a problem that's driving you mad, we'll be happy to try and help. Send your queries to the relevant email address shown on page 132.

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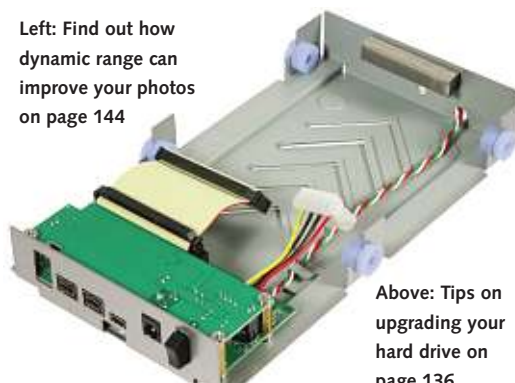
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# HANDS ON

27 PAGES OF...

- ADVICE
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- TECHNIQUES
- WORKSHOPS
- HARDWARE SOLUTIONS
- SOFTWARE SOLUTIONS
- Q&A

# Advice from our experts

Our experts offer advice and solutions to a variety of readers' problems

## HARDWARE

### Upgrade to DVI

**Q** I recently bought a new LCD monitor which has both analogue VGA and digital DVI inputs. My PC graphics card is quite old though, so only has an analogue output. Is it worth upgrading the card so I can use the DVI port on the monitor?

Jon Robbins

**A** This can be highly subjective, but in our experience we've found a DVI connection generally produces a slightly cleaner, sharper image with less ghosting. The difference, especially if you're using a high-quality analogue cable, can be very subtle, but it's definitely noticeable. But whether it's worth upgrading your graphics card is a different matter.

If you're thinking of upgrading for the DVI connection alone, we'd say it's probably not worth it. A new graphics card will, however, greatly improve your 3D gaming performance, so if that's something of interest to you, get yourself a new card and enjoy the upgrade to DVI at the same time.

### Memory matters

**Q** Is it necessary to upgrade my memory if I'm overclocking my processor? I have a 2.4GHz Pentium 4 that runs on an 800MHz bus with 400MHz DDR Ram.

Tony Westcombe

**A** To answer this question, you have to look into the process of overclocking itself. There are only two ways to overclock your processor: one involves increasing its clock multiplier, and the other involves increasing the system bus speed. Since the multiplier is locked on most processors including your 2.4GHz Pentium 4, your only option is to increase the system bus. Since the memory, graphics and PCI buses

ID	ActualMeasurement	Specification	UpperTolerance	LowerTolerance	Expr1	Expr2
1	0	34	2	2	1 not tested	not tested
2	47	46	4	2	2 tested	Pass
3	48	46	4	2	2 tested	Pass
4	49	46	4	2	2 tested	Pass
5	50	46	4	2	2 tested	Pass
6	51	46	4	2	2 tested	Fail High
7	48	46	4	2	2 tested	Pass
8	45	46	4	2	2 tested	Pass
9	44	46	4	2	2 tested	Pass
10	43	46	4	2	2 tested	Fail Low
11	42	46	4	2	2 tested	Fail Low
(Autounumber)	0	0	0	0		

SCREEN 1

operate as a multiple of the system bus, changing it will also have an impact on them.

For example, on your PC, your system bus may be 800MHz, but this is achieved using a 200MHz clock with data 'quad pumped' across the bus at four times this speed. Similarly, your 400MHz memory rating is achieved using a 200MHz clock and double data rate technology. So your memory is running on the same 200MHz clock as your system bus – it'll be set in your Bios as a ratio of 1:1.

Consequently if you increase the system bus to, say 210MHz to overclock

### 'Consider reducing the system bus to memory speed ratio in your Bios'

the processor, it'll also try and drive your memory at 210MHz externally or at an effective rate of 420MHz. If you're lucky, this may be within its tolerances, but if not your system will become unstable or even refuse to start up.

Faster-rated memory, such as 500MHz DDR, will accommodate the extra speed, but alternatively you could consider reducing the system bus to memory speed ratio in your Bios. You may be able, for example, to drive the memory at two-thirds of the system bus. If you overclocked to 210MHz, this would then drive the memory at 140MHz, to give an effective rate of 280MHz – well within the 400MHz rating of your memory.

Of course, for the best performance, you should match the speed of your system and memory buses, but reducing the ratio can allow you to solve overclocking instabilities without splashing out on expensive memory.

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## DATABASES

### Expression needed

**Q** I am trying to write an Access 2002 database for recording Goods Inward Inspections. I need an expression in a report that gives 'pass' if the part is within both upper and lower tolerance, 'fail' if it is outside either the upper or the lower tolerance and 'not tested' if it has not been tested.

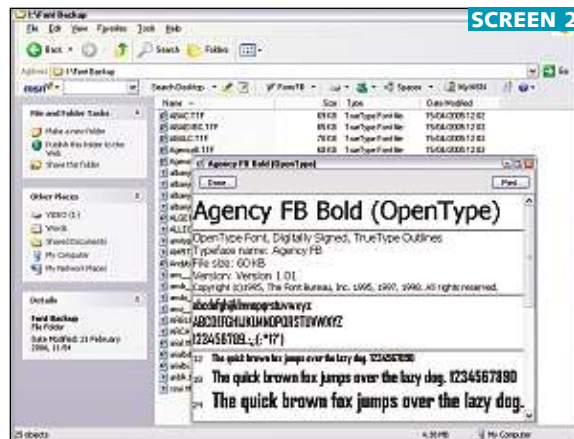
I cannot get the calculation into the table and cannot see how to write the expression in the report. How do I write this expression and how do I install it, or how can I do the calculation and save it in the table?

Sam Mendes da Costa

**A** One answer is to use a query to perform the test. You can then base a report on the query. Within the query you can create a field that uses a set of nested IIF statements. A single IIF statement can perform a test like:  
**IIF([ActualMeasurement] is equal to zero, then do this, else do this)**

(Key: ↵ code string continues)

For example, the expression:  
**IIF([ActualMeasurement]=0, "not tested", "tested")**  
 will look at the field called ActualMeasurement and, if it contains a zero will write 'not tested'. If there is



SCREEN 2

The font viewer shows full names of non-installed fonts

a value in ActualMeasurement then the expression will write 'tested'.

One of the great features of an IIF statement is that you can place one IIF statement inside another, like this:

```
IIF(ActualMeasurement is
equal to zero, then do this,
else do another IIF statement)
```

When you first meet this idea of 'nested' statements it's a bit odd, but you soon get used to it.

```
IIF([ActualMeasurement]=0,
"not tested",IIF([Actual
Measurement]>([Specification]
+[UpperTolerance]),"fail
High",IIF([ActualMeasurement]
<([Specification]-
[LowerTolerance]),
"Fail low","Pass")))
```

The expression above should solve your problem (see screen 1); although I haven't tested it rigorously, so please do so before deploying it operationally.

If you have bought the DVD edition of PCW, there is a demonstration query (TestGoods) in the sample database on the cover disc (DBCJUN06.MDB), and it can also be downloaded from [www.pcw.co.uk/2151344](http://www.pcw.co.uk/2151344).

Incidentally, you can enter and edit the data using the query, and see the evaluations change before your eyes as you do so.

## WINDOWS

### Finding fonts

**Q** I copied the fonts folder from my old PC to a CD and put this in my new PC, with a view to installing some of these. When opening C:\Windows\Fonts in the new PC all the font names were in full, whereas on the CD the font names were in abbreviated form and difficult to associate with the actual font name.

*Roger Castle-Smith*

**A** You need the special properties of the Windows fonts folders to see the font names listed, rather than the file names, but you can double-click on a font file anywhere to see a preview and the full name (see screen 2).

### Trouble at bootup

**Q** I have inadvertently created a problem which occurs on bootup, whereby I am presented with the option of selecting either Win XP Pro or Setup.

## Copying between Dos and Windows

### WORD PROCESSING

**Q** I read in the Hands on Windows column a couple of years ago how you could copy text between a Dos window and Windows.

That was perfect for me in my line of work, reporting conferences, since I type everything in Wordperfect 5.1 for Dos.

I often have to go back to the original to copy something else, and at the moment the only way I can do so is to create a .txt file in Dos and open it in Windows, which is rather tedious.

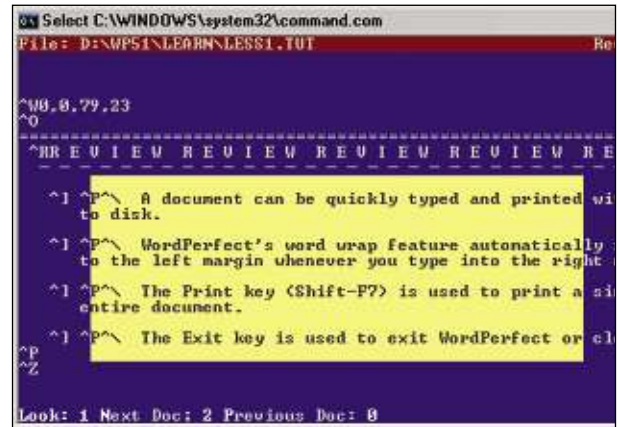
Is there any chance of you running this tip again in a future column?

*James Gourley*

**A** Right-click on the icon at the top left of the MS-Dos window, and choose Edit, Mark from the context menu.

You'll then be able to use the mouse to select text in the window. Note that this selects a rectangular area, rather than word by word, so you may need to select more text than you need.

Go back to the context menu, and Edit, Copy (or just press Enter) and the text will be copied to the Windows clipboard.



Move text from Wordperfect 5.1 or other Dos applications

This option is only available for a few seconds, or the setup mode will be automatically selected. If I select the XP option, Windows is loaded perfectly with no further trouble. I would be extremely grateful if you could provide a solution.

*George Howes*

**A** Go to Control Panel, System Properties, turn to the Advanced tab then click the Settings button in the Startup and Recovery section. At the top of the next screen you'll see a dropdown list of Default Operating Systems – select 'Microsoft Windows XP...' (you can also change the delay) and OK out of both dialogues. Reboot, and you should find you boot straight to Windows (see screen 3).

## DIGITAL IMAGING & VIDEO

### Colour-fast query

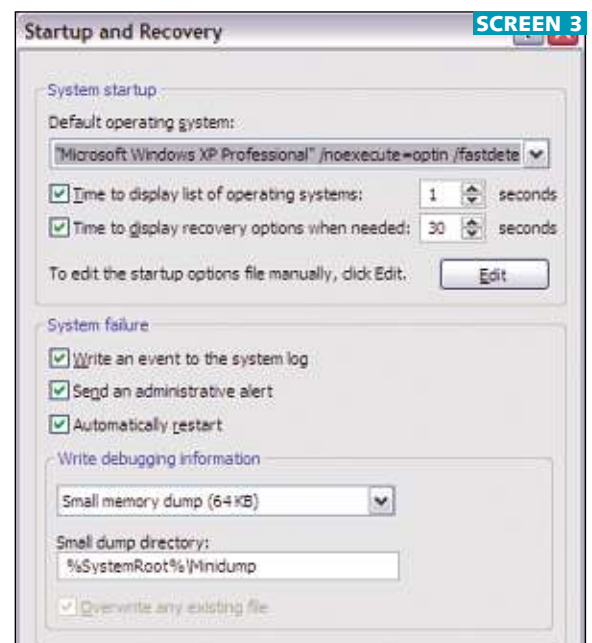
**Q** I am using my Epson Stylus Photo 950, with the manufacturer's ink and paper, to produce photographic output of pleasing quality, but I am conscious of the need to limit its exposure to bright light. When my mono laser printer died, I replaced it with a colour Xerox Phaser 6250.

While it is not in the same league as the Epson, I have found that it can reproduce photographic images quite satisfactorily. The advantage, of course, may be enhanced or otherwise by the light-fastness of the toner.

I would be grateful for any help you can give me: how long should I expect colour laser prints to last?

*David Morris*

Make sure you boot straight to Windows at startup





## Display a file's location

### SPREADSHEETS

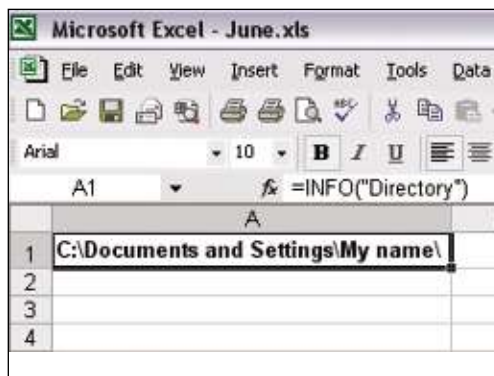
**Q** It would be very useful if I could automatically show the directory where an Excel workbook is stored at the top of its first worksheet. How can I do that?

Elliot Cage

**A** You can use the current information function. Enter in a cell:

**=INFO("Directory")**

and it will display the full path. This function offers 10 options, from telling you the amount of memory available ('Totmem') to the version number of Excel ('Release'). Alternatively, pick Header and Footer on the View menu.



Find out where an Excel workbook is stored

Click the down arrow by the Header box and the file path will be offered as one of the options.

## Get dummy text

**Q** I'm sure I've read – probably in PCW – how you can create dummy text in Word that consists of repetitions of 'The quick brown fox...' but I can't find any clues in Word help.

I'd like to use this to test a document layout. Could you shed any light on the matter?

Fran Lombard

**A** The incantation is =rand(x,y), where x is replaced by the number of paragraphs you want and y by the number of times you want the sentence to appear in each paragraph. It needs to be on a line by itself. Press Enter after the closing bracket and the expression will be replaced by the dummy text (see screen 4). This will only work if the Word Autocorrect options (Tools, Autocorrect options) are set to 'Replace text as you type'.

### SPREADSHEETS

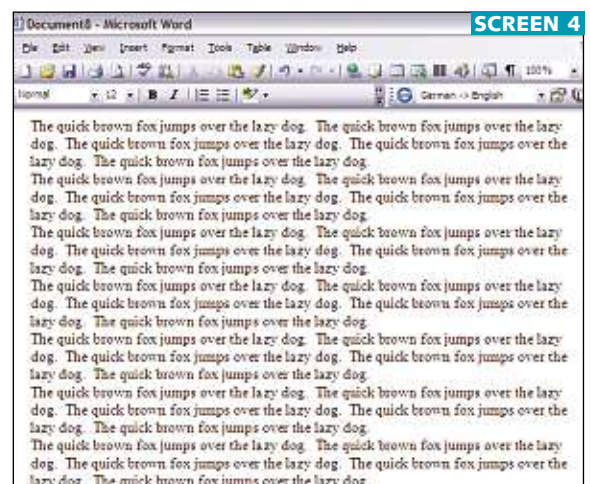
## Logging usage

**Q** How can I arrange for Excel to keep a record of the date and time a workbook was opened, preferably with the name of the user?

Oonagh Mcphee

**A** You can use a short macro that automatically runs when the workbook is opened. Press Alt & F11 to open the VBA editor. In the left-hand panel, choose the heading ThisWorkbook. In the right-hand panel enter:  
**Private Sub Workbook\_Open()  
Open ThisWorkbook.Path & "\usage.log" For Append As #1**

Creating dummy text in Word can help you check a document layout



**A** Early colour laser printers were notorious for the instability of their colours which could change within days, or even hours, of the print being made. Though huge improvements have been made, in stark contrast to the amount of data available for inkjet printers, we could find little information on the longevity of photographic prints produced by colour laser printers.

One of the foremost bodies researching the stability of photographic prints, Wilhelm Imaging Research, ([www.wilhelm-research.com](http://www.wilhelm-research.com)) doesn't even mention them.

This doesn't necessarily mean colour laser prints won't last a long time. You could always do your own tests. Though you won't be able to make the kind of 100-year and beyond predictions that specialist research labs produce, try making two identical prints, putting one in your window and

storing the other in a cool, dark, dry place for several weeks, then comparing the results.

### WORD PROCESSING

## Openfolder error

**Q** I have created the Openfolder macro exactly as you described in the March 2006 issue, and created a toolbar button. But when I run the macro I get 'Runtime error 53 – file not found'. I have looked in the debug pane, but cannot find the error there or from the Help file. Any ideas, please?

Tony Rix

**A** A lot of readers had trouble with the Word Openfolder macro and, as far as we know, everybody who queried this has had a personal reply.

For the record, here's the answer to the 'Run time error 53' conundrum. There should be a space between explorer.exe and the closing double-quote marks.

Similarly there should be a space between the comma following ActiveDocument.Path and vbNormalFocus.

If you look carefully at the code as printed you'll see that there are spaces between each of the first items and the diagonal arrow that signifies that the code should continue on the same line, but these are easy to overlook. Our apologies for any headaches this might have caused.

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## Fujifilm follow-up

Following the query from Peter Jacobs in the March 2006 issue, regarding continuous file numbering on the Fujifilm S602Z, several readers have emailed to say that their model does not support this feature. Thanks to all those who suggested a way around the problem. Once images are downloaded, don't format the card, and erase all the images bar the last one.

**Print #1, Application.UserName, Now**  
**Close #1**  
**End Sub**

(Key: ↵ code string continues)

A text file called usage.log will be created in the same folder as the workbook. It will give the user name, date and time. Whenever the workbook is opened after that a record will be added to this file. The only exception is if someone holds down Shift when they open the file as that action stops any macros from running. By changing the path in the second line you can have the usage.log in another folder.

## Date confusion

**Q** I've made a spreadsheet to calculate accrued pensions. In cell C5 the starting service date is entered in the dd/mm/yyyy format. Cell C6 is the finishing date. Cell C7 contains the formula:  $= (YEAR(C6) - YEAR(C5)) * 12 + MONTH(C6) - MONTH(C5) / 12$

to convert the difference into years. My computer uses the regional settings for English UK; however, many of the computers that this spreadsheet is run on are set to English USA. On these computers when the dates are entered in the dd/mm/yyyy format it causes a #VALUE! error in C7. Is there a way of inputting the dates in either US or UK set computers so as not to cause an error?

Nick Thatcher



**A** I think you realise that the Excel YEAR and MONTH functions work from the stored date number; and the cell formatting is for display purposes only. The problem occurs when people enter a date in a conflicting way. The easiest way round this is to have everyone enter the days, months and years individually in three narrow labelled columns. It would be quicker for them, too, as they don't need the two "/" marks.

## 'The only problem is I can't encode mp3s in KDE'

### LINUX

## Encoding mp3s

**Q** I've installed Kubuntu (Breezy Badger) and I've followed the recent articles on Ubuntu to get audio and video working, and everything seems to work great. The only problem is I can't encode mp3s in KDE. I get the option

**Install the lame library to encode mp3s in KDE**

for Ogg Vorbis and Flac but nothing for mp3s.  
 Daniel Aldred

**A** You need to install the 'lame' library. KDE uses the excellent lame encoder to create mp3s, but it requires the shared library instead of the command utility. When you install lame with Ubuntu it doesn't include the library, just the command utility. Install it separately with 'sudo apt-get install liblame0'. Log out and back into KDE to get it to notice the new library and that should fix the problem (see screen 5).

## Double Linux

**Q** I want to install two different versions of Linux on the same hard drive. I know this is possible but I can't figure out what to do. Doesn't the bootloader on the second copy overwrite the first?

Jon Weir

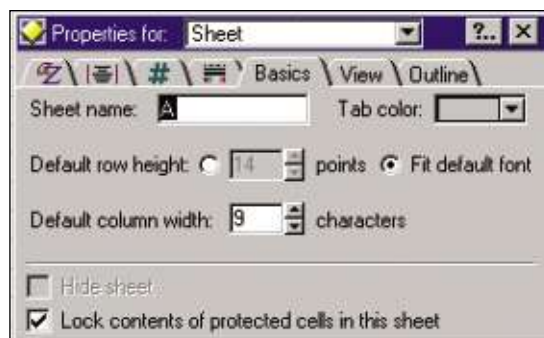
**A** Most people install the bootloader to the disk's Master Boot Record (MBR), but any partition on the drive can have its own bootloader. Using a bootloader to boot another is called 'chainloading' in grub (the Linux bootloader) terminology. You can chainload grub as many times as you like. On the second Linux version, install the bootloader on its partition instead of the MBR. You can configure grub to chainload the second, or run commands directly in grub at boot-time by pressing 'c'. To chainload partition 5 on the first disk drive you'd run three commands: root (hd0,4), chainloader +1, boot. Grub counts from 0, hence 0,4 for disk 1 partition 5. **PCW**

## Protecting cells in Lotus 123

**Q** How do I protect individual cells in Lotus 123?  
 George Pomphrett

**A** Perversely, you have to start by highlighting the cells you want left unprotected. Then press Alt & Enter to display the Range Properties dialogue box. Click on the golden key – the Security tab. Remove the tick next to 'Protect cell contents from changes'. Close this dialogue box. On the main menu choose Sheet, Sheet Properties and the Basics tab.

Now you can lock the rest of the worksheet by putting a tick against 'Lock contents of protected cells in this sheet'.



It's back to front, but you can protect cells in Lotus 123

This may seem a backwards way of doing it but, if it's any comfort, all leading spreadsheets work in a similar way.

### LET US HELP YOU

All our experts welcome your queries. Please respond to the appropriate address below

- Databases** database@pcw.co.uk
- Digital imaging & video** digitalimaging@pcw.co.uk
- Hardware** hardware@pcw.co.uk
- Linux** linux@pcw.co.uk
- Networks** networks@pcw.co.uk
- Performance** performance@pcw.co.uk
- Sound** sound@pcw.co.uk
- Spreadsheets** spreadsheets@pcw.co.uk
- Visual programming** visual@pcw.co.uk
- Web development** webdev@pcw.co.uk
- Windows** win@pcw.co.uk
- Word processing** wp@pcw.co.uk



**Gordon Laing** has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

→ Comments welcome on the Hardware column.

Email [hardware@pcw.co.uk](mailto:hardware@pcw.co.uk)

Please do not send unsolicited file attachments.

# In with the new

Upgrading a hard disk should be simple, but there are still a few gotchas

In this age of digital music, photos and video, you can never have too much storage. Unfortunately, what might have seemed like a gargantuan hard disk even a couple of years ago may now be full to the brim.

Luckily the cost per gigabyte of hard disks has fallen as our desire for larger capacities has increased. The simple solution is to buy a large new disk for your ageing system, but in practice you may run into problems.

The first and most common problem for owners of PCs more than a few years old is support for disks above 137GB. It sounds crazy today, but a limitation in both Windows and the Bios of older systems prevents them from recognising disks larger than 137GB, which can cause headaches for owners looking to upgrade.

The second issue is that even if your system does support disks greater than 137GB, you may find it increasingly hard to get hold of a disk that is compatible with the connectors in your system. Older PCs used the traditional wide 40pin parallel ATA connector for hard disks, but this is gradually being superseded by the newer Serial ATA (Sata) standard, which uses a much narrower connector and cable.

Admittedly the transition between the two connectors is taking place very gradually and there are still plenty of disks on sale with parallel ATA interfaces, but some of the newer models, not to mention the lowest priced models, may only be available with a Sata interface.

So what's the owner of an ageing system to do? This is a question posed to the Hands on Hardware mailbag on a regular basis, so we're devoting this month's Hardware and Performance columns to the various solutions. Here we'll explain the 137GB limitation and what can be done to get around it, while in the Performance



With half a terabyte of storage in a single 3.5in hard disk, Seagate's new 500GB 7200.9 drive is one of the biggest on the market – but how easy is it to fit a new disk to an older system?

column (see page 138) we'll put several solutions through their paces by fitting a brand new, top-of-the-range disk to an older system.

## The 137GB limit

In order for a PC to recognise IDE hard disks bigger than 137GB, its Bios and operating system must support 48bit Logical Block Addressing (LBA). Looking back a few years, the original LBA specification was introduced to solve another capacity issue, except back then it was to support disks larger than 504MB.

Following the introduction of LBA, a compatible Bios could recognise disks bigger than 504MB and compatible operating systems could format and address the additional space. As with so many developments in the IT world, though, what seemed to be an absurdly large upper limit at the time was reached surprisingly quickly.

LBA employed a 28bit addressing system with an upper limit of 137GB, more than 250 times greater than the previous ceiling it was developed to break through. But before long, hard disks approached this 137GB limit and the technology needed updating.

Enter 48bit LBA, which extended the upper limit to what seems like an astronomical 144,000,000GB, or 144petabytes. No doubt this will seem

restrictive in a few years, but today it allows plenty of room for growth.

So in order to use the full capacity of a disk larger than 137GB, you'll need a Bios and operating system that support 48bit LBA. If your PC is more than a couple of years old, it's best to check the Bios update pages of your motherboard manufacturer's website.

The updates should state, among other things, support for certain sizes of disk. If your system isn't too old, there might be a Bios update available that supports 48bit LBA. If so, follow your motherboard manufacturer's instructions to download the file and flash the Bios. If a suitable update is not available, you'll either need a new disk controller or an external solution, which we'll discuss later in this column.

In terms of operating system support, only the latest versions of Windows come with 48bit LBA support built in and enabled as standard. Owners of Windows XP will be fine so long as they're running Service Pack 1 or greater. Owners of Windows 2000 will need Service Pack 3, but will also need to perform a small Registry hack. This is detailed in Knowledgebase article 305098 at <http://support.microsoft.com> (type the number in the search box on the top left of the home page).

Things get trickier for owners of Windows ME and 98. Neither has native built-in support for disks larger than 137GB, although third-party controller cards or external drives can provide Bios support for 48bit LBA, and normally come with drivers that allow the OS to exploit them.

Windows 98 owners won't necessarily be completely in the clear, as the version of Scandisk that comes with it doesn't support partitions larger than 137GB. Fdisk may present problems, mistakenly identifying the capacity of a

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large disk – to be safe, partition the disk using a percentage rather than entering an amount in GB, or partition and format the disk using a more recent operating system. If you do partition and format the disk on another machine for use on a Windows 98 or ME system, use the Fat32 file system, as neither of those operating systems can recognise the NTFS file system.

Since support for a large disk on an older system will almost certainly be provided by a third-party controller, it's best to consult its documentation on how best to install the drive. And unless you're absolutely confident of sufficient support for disks larger than 137GB, play safe and install smaller disks such as a 120GB model.

As for Windows 95, the OS itself doesn't natively support disks larger than 137GB, and you're unlikely to find a third-party disk controller that will do the trick. Again, best to stick with 120GB disks or smaller.

**External hard disks**

External hard disks solve a lot of storage headaches by connecting to a USB or Firewire port on almost any PC. You don't need to open your system, fiddle with wires or worry about an incompatible Bios. You just connect one to an external USB or Firewire port.

External hard disks come in many shapes and sizes, but there's no magic going on inside: they simply consist of a standard hard disk fitted into a case with a small amount of electronics to control the external interface.

Models that use standard 3.5in desktop hard disks generally need mains power so are supplied with an appropriate AC adapter. Smaller models that use laptop-style 2.5in hard disks can often be powered by the external USB or Firewire port itself, making them very convenient for

portable environments. Lacie is one of the leading companies for external disks – see [www.lacie.co.uk](http://www.lacie.co.uk).

Most hard disk manufacturers sell external drives, but an interesting option for hobbyists is to buy an enclosure instead. These are empty cases, complete with the required electronics, but waiting for you to fit a hard disk inside. They're ideal for anyone who has a spare disk.

If you were planning on buying a new disk for an enclosure, it's worth comparing the total cost with that of a pre-built external hard disk – the latter can sometimes work out cheaper. If you are interested in enclosures, there's a good selection at The Direct USB Store at [www.directusbstore.co.uk](http://www.directusbstore.co.uk), including the model pictured above.

Operating system support for external hard disks and enclosures boils down to how well the OS supports the required external connectivity. For the best performance you'll want a fully operational Firewire or USB2 port, which means having Windows 98 SE onwards. Earlier operating systems could run into problems, but refer to the documentation for the enclosure or external disk.

**New disk controller**

If you'd like to fit a new large disk inside your PC but your motherboard chipset or Bios won't support it, the easiest solution is to fit a third-party disk controller card. Also known as Host Bus Adapters (HBAs), these slip into a spare PCI slot and essentially equip your PC with the ability to work with the latest disks. So long as the controller card comes

**The Promise SATA300 TX2 Plus fits into a PCI slot and equips a PC with two Sata ports and one parallel ATA connector, all supporting disks bigger than 137GB**

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**Above left: External drive enclosures take standard internal hard disks and typically connect to USB or Firewire ports, although models that support the new external Sata interface are also now available, such as the ST-M10, pictured**

**Above right: The inside of the ST-M10 hard disk enclosure: like other enclosures, you fit a standard hard disk and connect the power and data cables**

with drivers for your operating system, you should be in business.

Controller cards come in all shapes and sizes, supporting different numbers of disks or different types of connectivity. Many also support Raid options, allowing you to exploit multiple disks for greater performance, reliability or both.

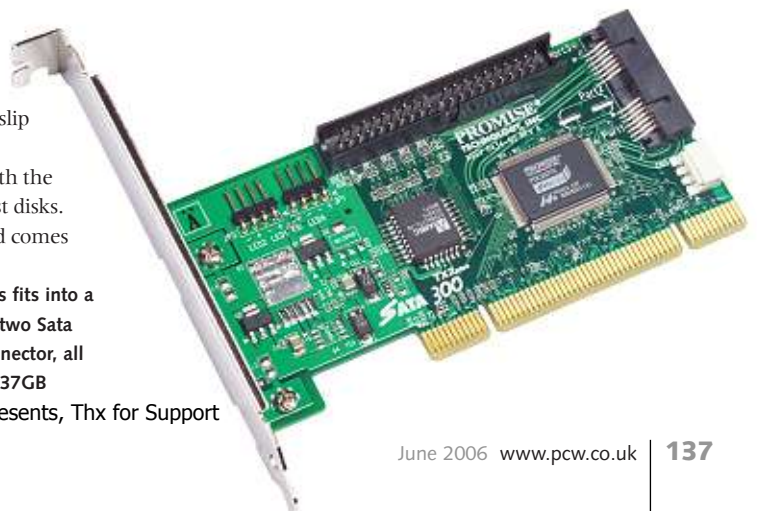
Promise is one of the biggest names in HBAs, with a wide range of models from the Ultra100 TX2 that supports Windows 95 onwards, to Raid controllers that can support six disks.

A great model for anyone who wants to fit new Sata disks to an older system is the Sata300 TX2 Plus, pictured below. It has two Sata ports that support the latest 3Gbit and Native Command Queuing (NCQ) technologies, and includes a single Parallel Ultra ATA 133 connector for older drives. It comes with drivers for Windows 2000, XP and Server 2003 along with Red Hat and Suse Linux, and costs around £45 – see [www.promise.com](http://www.promise.com).

If you plan to install Windows on a hard disk connected to a third-party controller card, you'll need to have the drivers for it on a floppy disk, and of course have a floppy drive to read it on your PC during the Windows installation procedure. It seems mad in this day and age to require a floppy drive to install a state-of-the-art disk controller card, but it remains necessary if you're going to install Windows onto a disk connected to the card.

If this sounds unreasonable or impractical, you'll need to keep your existing boot C drive and use the third-party card and extra disk as a non-booting drive 'D'. Then you'll only need to install Windows drivers for the card.

This month's Performance column looks at the practical side of using an external enclosure and third-party controller to fit an older system with a new 500GB disk. In the meantime, we'd like to hear about your experiences fitting new disks to older systems. **PCW**





**Gordon Laing** has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

→ Comments welcome on the Performance column.

Email [performance@pcw.co.uk](mailto:performance@pcw.co.uk)

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# Installing a larger disk

Practical solutions to overcome the limitations of using an old PC

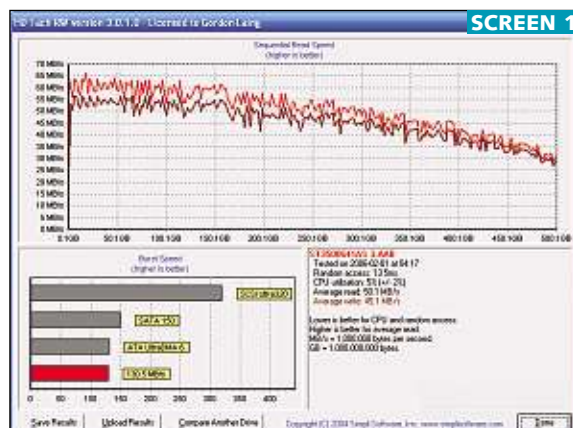
In this month's Hardware column (see page 138) we discuss the issues involved in fitting a new large hard disk to an older system. Problems include the inability to recognise capacities larger than 137GB, and more obviously, the absence of Serial ATA (Sata) ports to connect the latest drives.

A number of solutions exist to solve these problems, but before spending any money you should check the support section of your motherboard manufacturer's website to discover the largest disk your system will support, and whether any Bios updates will improve your situation.

If your machine's more than a few years old, it's likely neither your Bios nor operating system will natively support disks larger than 137GB. In this instance, you'll need third-party help from an internal disk controller card or an external disk enclosure. Both will allow all but the oldest systems to exploit new, large disks.

To put these options to the test I looked into upgrading the disk in a 1.8GHz Pentium 4 system with 512MB of Ram. This may not seem very old, but already the motherboard was imposing restrictions on the kind of disks I could fit. I was unable to confirm whether the latest Bios would support disks greater than 137GB, but either way, the connectivity was limited to parallel ATA disks, preventing me from trying a new Sata model. I decided to try an internal disk controller card but, beyond compatibility, the question was whether the old system would compromise the performance of the new disk.

To find out, I got hold of Seagate's 7200.9 500GB Sata disk. At the time of writing, this represented the state of the art in 3.5in hard disks, with a massive capacity and support for the latest 3Gbits/sec and Native Command Queuing (NCQ) Sata standards. To support this disk in my older system, I



fitted a Promise SATA300 TX2 Plus PCI controller card costing around £45. To compare performance against a current system, I also tried the disk with the onboard Sata controller on an Aopen i915GMm-HFS motherboard fitted with a 2.13GHz Pentium M Model 770 and 1GB of Crucial DDR2 memory.

To measure the performance on each system, I ran HD-Tach – see [www.simplisoftware.com](http://www.simplisoftware.com). HD-Tach runs under Windows 2000 or XP and measures sequential read, random access and interface burst speeds. To measure write performance, the drive must be blank and connected as a secondary disk to an existing boot drive.

Connected to the onboard controller of the Aopen Pentium M system, the Seagate 500GB disk scored 50.1 and 45.1Mbytes/sec for average read and write speeds respectively, while peaking at 130.5 Mbytes/sec for burst speed. Out of curiosity, I tried the Promise controller card in the Aopen system, upon which the Seagate disk scored exactly the same for average read and write speeds, although interestingly suffered from a reduced peak burst speed of 102Mbytes/sec.

I then fitted the Promise card into my older system, connected the Seagate drive and re-ran the tests. HD-Tach measured the average read and write

speeds again as exactly the same 50.1 and 45.1Mbytes/sec respectively, while the peak speed was 109.9Mbytes/sec.

I also tried the Seagate disk inside an ST-M10 enclosure from the Direct USB Store at [www.directusbstore.co.uk](http://www.directusbstore.co.uk). This enclosure uniquely supports Sata hard disks and employs an external Sata connector; if your system doesn't have an 'Esata' port, the enclosure can be bought with a suitable PCI card. Once again the HD-Tach benchmarks measured exactly the same average read and write times, although with a reduced burst speed of 96.4Mbytes/sec.

**The HD Tach results for a new Seagate Sata 500GB disk connected to the onboard Sata controller on a modern Aopen i915GMm-HFS motherboard. The average read and write speeds were 50.1 and 45.1Mbytes/sec respectively**

## On the cards

Sometimes when comparing different configurations, you're disappointed when the results aren't measurably different, but in this case it was quite reassuring. I was concerned the older system might compromise the performance of the new disk but, as the results showed, it made no difference.

Both the Promise card and the external disk enclosure allowed the new Seagate drive to perform no differently on an older system as it had on a new one, while eliminating concerns over compatibility and support. I later configured a similar Sata disk as the new boot drive on my old PC, giving the full performance and capacity to my C: volume. As mentioned in this month's Hardware column, to set up a disk connected to a third-party card as a boot volume you still need the card's drivers on a floppy disk for the initial Windows installation. Hopefully this will improve with a future version of Windows.

In conclusion, if there's no update for your Bios to support big disks, you should certainly consider fitting a third-party controller card. So long as the card comes with drivers that support your operating system, you should be enjoying larger capacities with relative ease. **PCW**

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**Tim Nott** is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ Comments welcome on the Windows column.

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# Ini at the deep end

An investigation into the murky depths of .ini files and customising IE's privacy settings

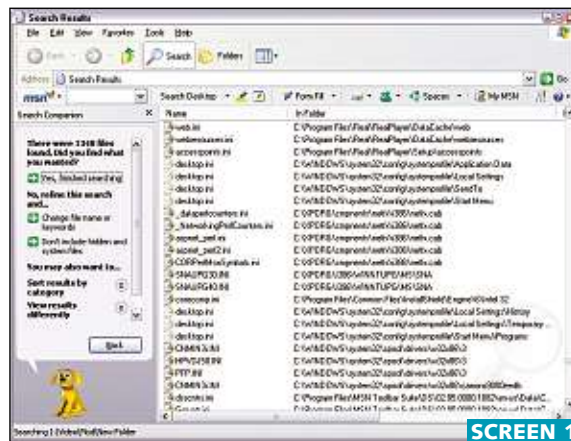
Since the amalgamation of the three Windows columns, we've been taken to task by some readers for focusing on the 'really basic everyday stuff' and neglecting the 'really geeky'. So this month we're going to get our anoraks seriously dirty with a look at the Windows XP .ini files and a tip for customising IE's privacy settings.

Back in Windows 3.x days, practically all Windows' settings were stored in .ini files. These plain text files covered everything from hardware (System.ini) to installed fonts and desktop settings (Win.ini). All this data (joined by much more) migrated to the Windows Registry in Windows 95, but if you search for .ini files on your computer, making sure you have the search hidden, system and sub-folders options enabled, you'll probably still find hundreds (see screen 1).

## The files that never die

In Windows 2000 and XP, you will have a Boot.ini in the root of the boot drive (usually C:\). This, as we discussed at length last June, controls the boot menu options (if any) you get when Windows loads. Many more .ini files will be for applications – the name or location should make these fairly obvious, and we'll ignore them. Then you'll have a load of Annnnnnnn.ini files in subfolders of the System Volume Information\\_restore... folder. These are System Restore backups, and we'll pass over these as well.

You'll find, in the Windows folder, the fossils of Windows 3.x – Win.ini, System.ini and Control.ini. These are provided for backward compatibility with 16bit applications – they are not used on a regular basis, but if an old application writes to them, the changes will be spotted and the relevant settings added to the Registry. You'll find more .ini files in the



SCREEN 1

Windows\Driver Cache .cab files with copies in the Driver.cab files if you have the XP installation files copied to your hard drive. Again, these are not in regular use, (they're mainly for installing printer drivers) and we'll ignore them for now.

Each user will have in their profile (for example, C:\Documents and Settings\Your Name) an Ntuser.ini file, and there may be files of this name in the LocalService and NetworkService profile folders. We can deal with these quickly as they specify what settings and data – such as Temporary Internet Files and IE History – are not included in roaming profiles (see screen 2).

## Keys to the desktop

This should leave us with a lot of Desktop.ini files. These are the key to giving folders special status or customising them. Some system folders, such as the Fonts and History folders, derive their special powers from a CLSID or UICLSID entry in the Desktop.ini that identifies them through the Registry. These should be left strictly alone, but Desktop.ini files can apply to user-created folders as well. In July 2005, we showed how to add a background picture to an XP folder – as you could in the user

interface of Windows 98 and ME – by editing the Desktop.ini directly. And we've seen other tricks, such as adding a pop-up comment to a folder or changing the text colour.

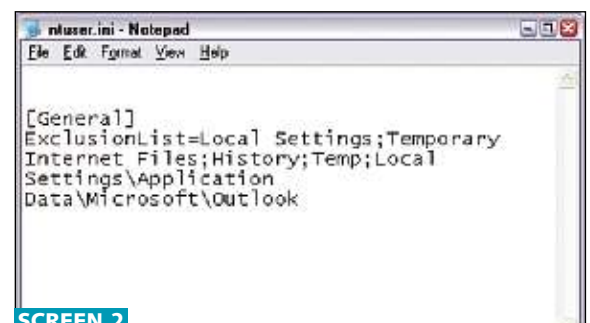
Desktop.ini files are usually flagged as hidden system files. So make sure you have 'Show hidden files and folders' enabled but 'Hide extensions for known file types' and 'Hide protected operating system files' disabled in Folder Options, View.

All .ini files consist of sections headed by text in square brackets, and Desktop.ini files can have several sections. The [LocalizedFileNames] heading is present in many of the Start Menu folders, the Quick Launch toolbar folders and the Send To folders in the various user profiles. We haven't been able to find documentation on this, but these appear to contain supplementary information on shortcuts, such as the one to Activate Windows.

The [ExtShellFolderViews] section is of little relevance to XP, although, if you've upgraded your system from Windows 98, ME or 2000, you may find some Desktop.ini files still have it. It will always be found with one or two other sections whose names consist of a GUID such as [{8BEBB290-52D0-11d0-B7F4-00C04FD706EC}]. These are used to specify a Web View template. In earlier versions of Windows, the templates (.htt files) could be used to customise folders (we looked at this in

**Look for .ini files on your computer and you'll probably find hundreds**

**Unwanted baggage – certain setting and data don't get copied to roaming profiles**



SCREEN 2

YYePG Proudly Presents, Thx for Support

August and September 2001) but in XP things have been simplified. You'll still get a choice of templates in the 'Customize folder' dialogue, such as Documents, Pictures, Photo Albums, Videos and so on, and these will control what appears as 'Folder Tasks' in the left-hand pane. These also affect the view options – if you choose Photo Album or Pictures, for instance, you'll get the 'Film Strip' view option, where you can see a strip of thumbnails along the bottom of the folder with an enlarged view of the selected image above. This choice is stored in the Registry, not in the Desktop.ini file.

Having said that, you can still use those sections to assign a background image to a folder and change the icon label font colour. We covered this last July, but here are the bare bones again:

```
[ExtShellFolderViews]
{BE098140-A513-11D0-A3A4-00C04FD706EC}={BE098140-A513-11D0-A3A4-00C04FD706EC}
[{BE098140-A513-11D0-A3A4-00C04FD706EC}]
Attributes=1
IconArea_Image=imagefile
IconArea_text=0x00FFFFFF
```

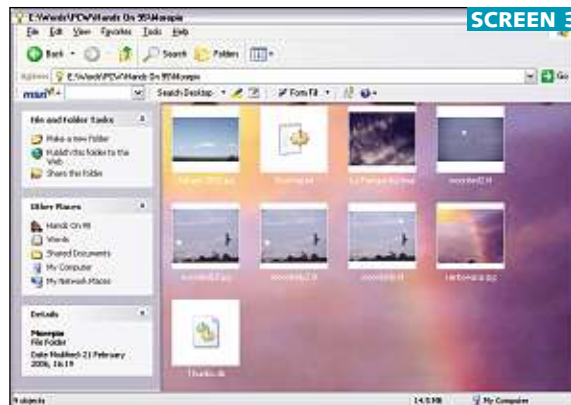
(Key: \ code string continues)

Replace imagefile with the path to the image you want to use and change the last six characters of the last line to give the blue, green and red components of the colour in hex. Our example maximises all three to give white, but 0x0FF0000 would give pure blue, for example (see screen 3).

The most important section we are going to consider is [.ShellClassInfo]. A neat way to create a Desktop.ini in XP is to open the folder, then go to View, Customize this folder... and in the dialogue that appears, change the folder icon. This will create the Desktop.ini file (with the hidden and system attributes turned on), the [.ShellClassInfo] section and the entries for the custom icon. These last take the form:

```
IconFile=%SystemRoot%\system32\
SHELL32.dll
IconIndex=22
```

The first line specifies the file where the icon is located – you can hit the Browse button to choose files other than Shell32.dll – and the second line specifies the position of the icon in the file. In the dialogue this counts from zero down through the columns, so the example above corresponds to the magnifying glass icon (see screen 4). If you don't want a custom icon, go back to the 'Change icon' dialogue and hit the 'Restore Defaults' button. This will



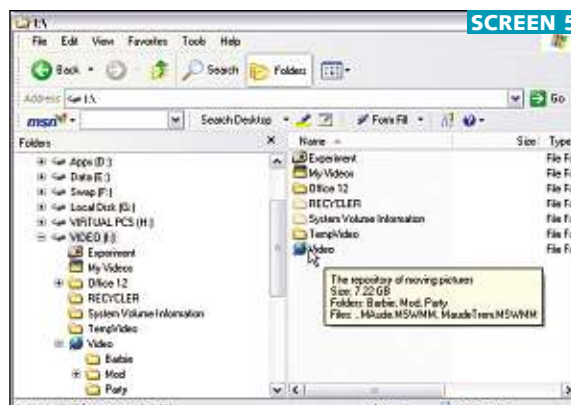
Top: How to wallpaper an XP folder

Bottom: you can choose a custom folder icon

InfoTip=[text] lets you add text to a folder pop-up

get the default icon back, but you'll be left with the Desktop.ini file and an empty [.ShellClassInfo] section. The 'Choose Picture' option doesn't create or modify a Desktop.ini file – once again, this information, together with other folder settings such as column widths and order, is stored in the Registry.

There are other possible entries under [.ShellClassInfo]. You may see a LocalizedResourceName entry – this is used by Windows to get the folder name from a DLL, and shouldn't be altered. NoSharing and ConfirmFileOp don't seem to have any effect in XP, although



in other versions the first, when set to 1, would stop the file being shared, and the second, when set to 0, would suppress the warning message that you were deleting a System Folder. Unlike previous versions, we have found XP doesn't require that the folder's system attribute be set for the Desktop.ini file to function, but the Read-only attribute is set when you create a Desktop.ini using the method described above. 'Read-only' should be taken with a pinch of salt as you can still delete or move the folder, but it seems that the attribute flags the folder as customised.

One other entry that still works is InfoTip=[text], which contains any text you want to pop up when the mouse pointer is over the folder icon; it should be self explanatory (see screen 5).

Finally, each user's 'My Documents', 'My Pictures' and other 'My...' folders have a [DeleteOnCopy] section containing information on the owner and customisation status (for example, if you have renamed 'My Documents'). If you copy the folder elsewhere – for instance, to back up the contents – these entries will not be copied.

One Windows annoyance is that Notepad starts up with a Desktop.ini file loaded when you start your computer. This happens when the Desktop.ini file in your profile's Startup folder, or the All User's Startup folder, has shed its Hidden and System attributes. Since .ini files (when unhidden) are set to open with Notepad, it is just obeying orders. Find out which folder it's in by going to File, Save As... in Notepad. To solve the problem, open a command prompt, navigate to the relevant folder and enter the command: attrib +s +h desktop.ini.

**Controlling cookies**

Cookies can be useful or a nuisance, and it can be tempting to turn them off altogether. This, however, will fall foul of sites that insist you accept cookies. The trick is to turn all cookies into 'session' cookies, so they are deleted when Internet Explorer (IE) is closed. IE's settings interface doesn't offer this as an option but, as reader Richard Wilson points out, an XML file can be used to 'fine tune' IE settings, by going to Internet Options, Privacy and clicking the Import button. We don't have room this month to elaborate on how this works, but Richard has kindly pointed us at a suitable file at [http://anon.inf.tu-dresden.de/ie6\\_privacy\\_en.html](http://anon.inf.tu-dresden.de/ie6_privacy_en.html), and an explanation of how it all works at [http://vlaurie.com/computers2/Articles/custom\\_privacy\\_file.htm](http://vlaurie.com/computers2/Articles/custom_privacy_file.htm). PCW





**Barry Shilliday** has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time he prefers to travel the world – and snap it with his camera.

→ Comments welcome on the Linux/Unix column.

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# Resolving Ubuntu screen setup

A step-by-step guide to help you solve some common graphics problems

If you've been following the Linux/Unix Hands on columns for the past few months (the previous instalments are available for free download at [www.pcw.co.uk/2150862](http://www.pcw.co.uk/2150862)) and have decided to give things a try, you'll now hopefully have a fairly good installation of Breezy Badger, the version of Ubuntu Linux released in October 2005.

We've looked beyond the initial installation to a lot more, such as setting up video and DVD playback and using Ubuntu's user-management system to add administrator users. By the time you read this, the next release, Dapper Drake, should be available for download, but in the meantime we'll look at some of the common problems associated with Ubuntu Linux; these also apply to Dapper.

One issue is the screen resolution. Many people have emailed with problems regarding their screen setup. When you first install Breezy, the installation program attempts to read the monitor settings and automatically configure your graphics card and screen. Usually this works well: a monitor is capable of telling the system which resolutions it can display and, for LCD monitors, which resolution is the most appropriate. However, sometimes there are problems with this detection. In these cases, Ubuntu throws up a screen asking you to select which resolutions you want to use. This is where you should make sure you select the highest resolution you'll want to use. If you accept the defaults and continue with the installation, these resolutions will be the only ones available to you once the installation is complete.

## Limitations

This brings us to what may be Ubuntu's biggest drawback: it lacks

```

SubSection "Display"
    Depth         4
    Modes         *1024x768* *800x600* *640x480*
EndSubSection
SubSection "Display"
    Depth         8
    Modes         *1024x768* *800x600* *640x480*
EndSubSection
SubSection "Display"
    Depth         15
    Modes         *1024x768* *800x600* *640x480*
EndSubSection
SubSection "Display"
    Depth         16
    Modes         *1024x768* *800x600* *640x480*
EndSubSection
SubSection "Display"
    Depth         24
    Modes         *1280x1024* *1024x768* *800x600* *640x480*
EndSubSection
  
```

many of the administrative utilities other distributions have. Suse Linux has Yast, for example, which helps you configure all sorts of tasks, from setting up hardware to controlling remote logins. It's easy to forget that Ubuntu is only around a year old and, as such, is still developing rapidly. As things stand, there are no graphical utilities for reconfiguring the graphics hardware, or other immediately obvious ways to do it. This problem has presented itself with a number of readers.

The configuration for both the graphics card and the monitor is stored in the file `/etc/X11/xorg.conf`. This is a plain text file and is suitable for editing. One way to change the screen resolutions is to load up this file and change them directly. If you want to take a look, run the following command in a terminal:

```
$ sudo gedit /etc/X11/xorg.conf
```

## Go gedit

Gedit is Gnome's standard text editor and is very easy to use. If you don't want to change the file directly, it's still safe to load in gedit provided you don't save any changes. Towards the end of the `xorg.conf` file you'll see a line that

**Adding a new resolution to the `xorg.conf` file manually**

**Mimic the installation procedure to change screen capabilities**

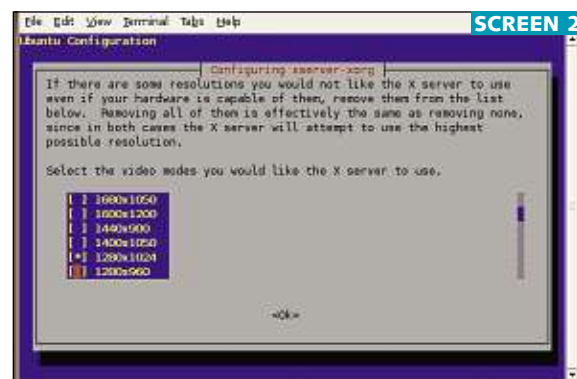
reads 'Section "Screen"' and, just below, a list of screen resolutions. The 'Depth' field refers to the numbers of colours; you're almost certainly using 24bit colour. The resolutions listed are those you can choose from, and the first in the list is the one the system defaults to. If you have an LCD monitor whose native resolution is 1,280 x 1,024 (typical for a 17in or 19in screen) and only an 800 x 600 maximum resolution listed, you won't be able to use the screen's best resolution. Just

add 1,280 x 1,024 to the list in the same way as the others. See screen 1 for an example.

Before saving any changes to the file, it's a good idea to make a backup just in case you make a mistake. To use the newly saved resolutions, log out and restart the X server by pressing `Ctrl & Alt & backspace`. All being well, the login manager should appear again at the new resolution.

## Automatic reconfigure

An alternative method for changing the resolution is to simulate the process you went through during installation. Ubuntu uses software packages to install applications, and



YYePG Proudly Presents, Thx for Support



You can switch between available resolutions from the desktop

these packages can contain scripts that configure the new software. There's a standard command, `dpkg-reconfigure`, which lets you re-run these configuration scripts on a package that is already installed. To do this, open up a terminal and run: `$ sudo dpkg-reconfigure -phigh xserver-xorg` (Key: ↵ code string continues)

The package we're configuring is `xserver-xorg`, since it's the X server configuration that `xorg.conf` holds. The `-phigh` option tells the utility to configure itself as much as possible; this is how things are done on a standard installation. When you run this command you should see screen 2, which is identical to the one presented on installation. Select the screen resolutions you want, remembering that the highest one you select is the default. The process automatically generates a backup copy of your `xorg.conf` file in the `/etc/X11/` directory. Log out and restart the X server as above to use the new resolutions.

Once the `xorg.conf` file is configured correctly, you can choose which resolution you want to use from within the desktop. Load up the 'Screen Resolutions' tool from the Preferences menu and pick whichever you want (see screen 3).

### Graphics drivers

Still on a similar subject, Breezy comes supplied with open-source drivers for almost all graphics cards. These generally work perfectly. Most people have either an ATI or an Nvidia-based graphics card, and both companies supply optional closed-source proprietary drivers. The Nvidia proprietary drivers, in particular, offer substantial benefits, as the open-source drivers do not support any hardware 3D acceleration at all. The proprietary drivers might help with better support for newer cards and are almost certainly needed if you want to play 3D games.

## 3D eye candy for Linux

There have been some significant developments lately on the Linux desktop front. For a long time, X.org has supported 3D rendering in applications and games, but the desktops themselves have not. This all began to change in February when Novell developer David Reveman released the Xgl server code and its compositing window manager, `compiz`.

Xgl is a significant development. It replaces much of the code in the traditional X server so all drawing is done via OpenGL (Open Graphics Library), the cross-platform alternative to Microsoft's DirectX. This means that, not only is the drawing of the screen performed by the graphics card rather than the processor, but it's also possible to perform some spectacular effects when combined with a compositing window manager such as `compiz`.

David Reveman released a demonstration video using `compiz` with Xgl. It sparked massive interest in the project and within a week or two many people successfully had it up and running on their desktops. On the test releases of Dapper Drake, it was almost trivial to install. You can download the video at [www.freedesktop.org/~davidr/xgl-demo1.xvid.avi](http://www.freedesktop.org/~davidr/xgl-demo1.xvid.avi) or, if you've bought the DVD edition of PCW, you'll find it on the cover disc. To play it, you'll need to install the free Xvid codec. `Compiz` provides many effects unavailable on any other operating system and, in some cases, exceeds those provided by Apple's OS X. It doesn't require any applications to be aware of the new server; only the window manager needs to know about the



With Xgl and compiz you can rotate your desktop instead of simply switching it

some for the very same reasons it doesn't appeal to others. Xgl's demonstration video and the fact that it's relatively simple to set up works in its favour. Keep a look out for our move to Ubuntu Dapper Drake; this will almost certainly involve installing and configuring one or the other of these graphics servers.

To install the Nvidia drivers, run the commands:

```
$ sudo apt-get install nvidia-glx
```

```
$ sudo nvidia-glx-config enable
```

Or to install the ATI drivers, run:

```
$ sudo apt-get install fglrx
```

ATI users must then edit the `xorg.conf` file (as explained above) and change the line under the 'Device' section which reads 'Driver "ati"' to 'Driver "fglrx"'. Reboot the system to ensure the correct kernel modules are loaded and the new drivers should then be in use. If you browse through the output of the 'dmesg' command

you should see some references to `fglrx` or `Nvidia`.

An entertaining way to test your 3D setup is to run the game Chromium. This is a 3D arcade-style shoot-'em-up game, which uses some basic 3D rendering. The effects will work on even the oldest graphics cards, but will be too slow for the software rendering supplied by the open-source Nvidia drivers and some open-source ATI drivers. Install the game with Synaptic, or just enter into a terminal:

```
$ sudo apt-get install chromium PCW
```



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→ Comments welcome on the Digital imaging & video column. Email [digitalimaging@pcw.co.uk](mailto:digitalimaging@pcw.co.uk) Please do not send unsolicited file attachments.

# Home on the dynamic range

How to help your photos show the highlights and lowlights of the real world

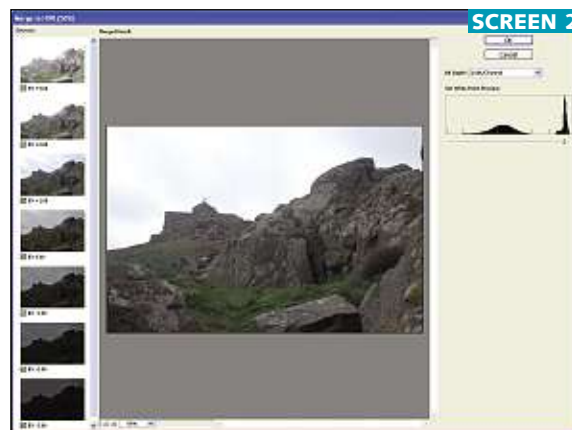
**D**ynamic range is a term used to describe the range of light levels in a scene which a device is capable of recording. In photography, dynamic range is expressed in f stops. Digital SLR sensors and colour slide film have a dynamic range of around six stops (though differences in the way electronic sensors and film respond at the extremes of the tonal curve make such statements something of a generalisation). Colour negative films benefit from a slightly greater dynamic range – let's say seven stops – and black and white film, with around eight to nine stops has the widest dynamic range of all (and is therefore more forgiving of exposure errors).

Regardless of these differences, all these media suffer from the same problem; none of them has sufficient dynamic range to faithfully reproduce all the tones that we can see and want to capture in our images.

Typically this occurs in landscape photography. If you make an exposure that captures shadow detail in the foreground, the highlights in the sky are burned out; if you do the reverse and expose for the highlights, there's no detail in the shadows. Other situations where dynamic range is a problem include shooting interior scenes where the outside world is visible through windows or beach and snow scenes.

Film photographers use graduated neutral density filters to bring sky highlights into line with the rest of the scene – effectively bringing the dynamic range within that capable of being recorded in a single exposure. But digital imaging provides us with some new approaches.

You can, of course, use levels, curves and other remapping tools to correct minor exposure problems, but if the data isn't there to begin with, no



amount of tweaking will help. Photoshop CS2's 'Merge to HDR' feature effectively allows you to combine the best bits of several exposures to produce one 32bit HDR (High Dynamic Range) image. This is then downsampled to produce a 16 or 8bit photo with a much wider dynamic range than would have been possible with a single exposure.

## Shooting for HDR

Clearly, if you're going to sandwich several images together to produce one, registration of the individual images is going to be crucial and so you'll need to use a tripod. Unlike Ulead PhotoImpact 11 (see the box on

the opposite page), Photoshop's Merge to HDR makes no attempt to mask artifacts caused by camera or subject movement, so you need to take care there are no people, traffic, birds or moving clouds in the frame.

Merge to HDR will work with as few as three exposures, but you'll get better results with five, or even seven. This is one good reason not to use your camera's auto exposure bracketing function which will probably provide you with only three; another is that the typical one-third of a stop difference isn't sufficient.

The approach I find works is to use fully manual exposure and meter to find the 'correct' exposure. Then change the shutter speed to make the first exposure three stops under, then two, then one, followed by the correct exposure and three over-exposed frames, giving seven frames in total (see screen 1).

The correct exposure for the sample image was 1/125 seconds at f7.1 and the seven frames were all shot at the same aperture with exposure times of 1/15, 1/30, 1/60, 1/125, 1/250, 1/500 and 1/1,000 seconds. Keeping the aperture the same and varying the shutter speeds ensures constant depth of field. If your camera doesn't have manual exposure controls you could achieve the same results using the exposure compensation setting.

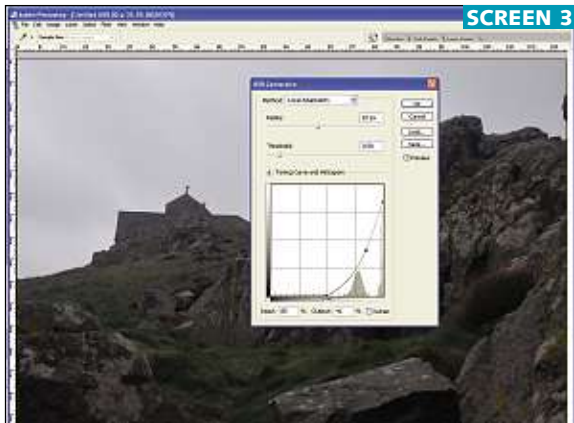
## Using Merge to HDR

You can run Merge to HDR from Photoshop (select File> Automate> Merge to HDR) but if you're working with raw images it's easier from Adobe Bridge. You just select your bracketed images from the content area and select Tools> Photoshop> Merge to HDR. This opens all the images in Photoshop using the default Adobe Camera Raw settings (see screen 2).

The Merge to HDR dialogue box then opens with thumbnails for each

**Top: To produce an HDR image you need several bracketed exposures**

**Bottom: Don't expect a 32bit HDR image to look terrific on an 8bit display**



SCREEN 3

of the source images displayed on the left and a preview of the merged 32bit HDR composite. Naturally, as you'll most likely be viewing this on an 8bit display you won't be able to appreciate it in its full glory, but nonetheless the preview, as well as any 16 or 8bit file downsampled from the 32bit original will display a much wider tonal range.

You can do two things here. One is remove individual source images from the mix. You might want to do this if, for example, something moved during one frame causing a ghosting artifact, or if a frame at either end of the range adds little or nothing to the end result.

You can also set a histogram slider called 'Set White Point Preview' if you intend to output a 32bit image (at some point you will have to downsample to 16 or 8bits) this only affects the preview.

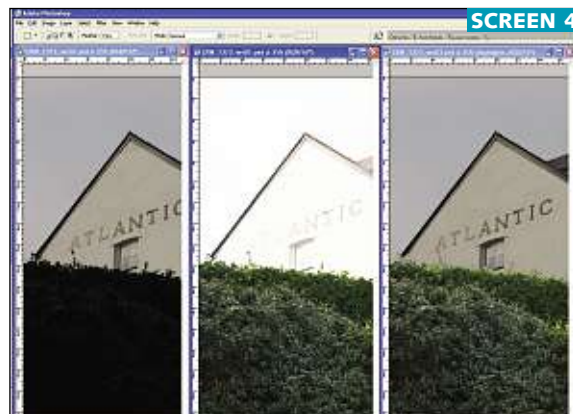
Click OK using the default settings and the 32bit image is created and opened in Photoshop. Don't despair if it looks grey and washed out – this is to do with the limitations of your display. You can improve things by selecting View> 32bit Preview Options and either changing the default Exposure and Gamma settings, or choosing the Highlight Compression preview option. Unless you intend to work on the 32bit file, you'll need to convert it to a 16 or 8bit file. Do this by selecting Image> Mode> 8 Bits/Channel or Image> Mode> 16 Bits/Channel.

When converting a 32bit HDR image the HDR conversion dialogue box opens, providing a pulldown menu with four conversion methods – Exposure and Gamma, Highlight Compression, Equalize Histogram and Local Adaptation (see screen 3).

If you want to know the difference between these conversion methods the Photoshop help file provides an explanation, but generally speaking, you'll have to experiment to find the best results with your own HDR images. Start out with Equalize

**Photoshop provides four methods for converting 32bit HDR images to 16 or 8bit files**

**The two raw images optimised for highlights and shadows respectively and the layered result (right)**



SCREEN 4

## Ulead Photoimpact's HDR features

You don't need Photoshop to produce HDR (High Dynamic Range) images. Ulead Photoimpact 11 provides HDR features that exceed Photoshop's and it works well with Raw images. Photoimpact's HDR dialogue box has three tabbed panels which are used to compose, optimise and edit the HDR image.

The outstanding feature of Photoimpact's HDR is that it can overcome mis-registration by automatically aligning images – so no need for a tripod. Even better, it can remove detail that appears in one image, but not others. So cyclists, birds and people can be made to vanish, either automatically, or by brushing them out. The auto remove artifacts feature works better than you'd expect, but not as well as manual brushing

which requires no great skill – a rough daub is all the program needs to identify the offending object.

Optimisation involves adjusting contrast, highlight, midtone and shadow sliders which, while more straightforward and easy to understand than Photoshop's methods, provides less flexibility. The Operations tab merely provides a few basic editing features which could easily be carried out later.



**Ulead Photoimpact 11 removes stubborn detail other applications leave behind**

histogram which is automatic and compresses the dynamic range of the HDR image while trying to preserve contrast. When you've gained some experience, or if Equalize Histogram produces poor results, you can experiment with the other options which offer more control.

### Widening dynamic range

If you're working with Raw files, an easier way to extend the tonal range is to produce two versions from one file in Adobe Camera Raw – one optimised for the shadow detail and the other for the highlights. The advantage of this method is you don't need multiple shots with all the drawbacks that entails, such as using a tripod and ensuring zero subject movement.

In screen 4, I want to bring out the detail in the hedge without losing it on the white building. Camera Raw's Exposure, Shadows and Brightness sliders allow you to get the most from the captured data without compromising quality, but by stretching the histogram to bring out the detail in the hedge, the building becomes brighter, and we don't want that.

The solution is to produce two images from the Raw file. With this image (on the left) the highlights – the wall of the building and sky – were rendered with the following Camera Raw settings: Exposure 0; Shadows 5; Brightness 50; Contrast +25; Saturation 0. Then a second image (centre) was produced using the following settings to bring out the detail in the hedge: Exposure +1.5; Shadows 0; Brightness 120; Contrast +25; Saturation 0.

The 'highlights' image was then superimposed as a layer on top of the 'shadows' image. To produce a layer mask for the highlight layer based on its luminosity, Ctrl & Click its RGB thumbnail in the Channels palette, then click the add layer mask button at the bottom of the Layers palette. Use Threshold to make the mask black and white, then tidy it using the brush tool. The mask still needs work, but you can see how effective this technique is. **PCW**



**Tim Nott** is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ Comments welcome on the Word processing column.  
 Email [wp@pcw.co.uk](mailto:wp@pcw.co.uk)  
 Please do not send unsolicited file attachments.

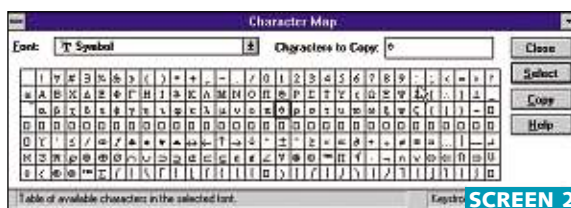
# Understanding Unicode

Discover the benefits of the Unicode standard; plus headers and footers revisited

**R**egular readers will notice that this month sees the start of an expanded Word processing column, glorying in an extra page and more screenshots. This, we hope, will let us 'get out a bit more', as well as concentrate on the perennial Microsoft Word problems.

So this month we're going to step back from applications and look at something central to word processing – the Unicode standard. Early PCs and teletype terminals used the Ascii character set for storing text. Each character was stored in 7bits, which gave a total of 128 'slots'. The eighth bit, commonly known as the 'Parity Bit' was used for error checking. Some of the slots were taken up with control characters such as carriage return, line feed and bell that clearly show their teletype (or typewriting) antecedents. This left room for the 26 letters of the English alphabet in upper and lower case, the numerals 0 to 9, basic arithmetical operators and some punctuation marks (see table below).

But there was no room for currency symbols (other than the dollar) or accented characters. The Ansi standard – as used in the earliest versions of Windows onward – stores each character in 8bits, or one byte – and effectively doubles the capacity of Ascii, with the additional 128 characters



comprising the so-called 'Latin-1' set. This contains common European accented characters, more currency symbols, fractions, degree symbol and, for those of you typing in Icelandic or Old English, the Eth and Thorn characters. Although many of these are not accessible from the standard UK keyboard, you can get at them from the Windows Character Map applet, or by holding down the Alt key and typing 0nnn on the numeric keypad, where nnn is the Ansi code of the character. Alt & 0163, for example, will produce a pound sign, even on a non-UK keyboard, and Alt & 240 will get you a lower-case eth should you find yourself in need of one (see screen 1).

**Top: The standard Ansi Latin-1 set adds 128 characters**

**Bottom: The Windows 3.x Symbol font expands your options further**

This catered pretty well for most US and western European users, but not for eastern Europeans or the Welsh who use additional accented characters, let alone those typing in Greek, Cyrillic, Hebrew, Arabic, Chinese or other character sets.

There are two workarounds. One is to use 'code pages', which swap around the upper 128 characters – so instead of the Latin-1 set you can have Greek or Cyrillic characters, for example. The other is to use 'pi' fonts – non-standard character sets that can contain anything the designer wants to put in there – such as the Windows Symbol font, which has been with us since Windows 3.x days (see screen 2).

The drawback is that, whereas all Windows users will probably have the same Symbol and Wingdings fonts, if they want to use a full Cyrillic alphabet, for instance, they will need a third-party font. And this brings a number of problems – word processors such as Wordperfect and Lotus Word Pro ship with a variety of pi fonts, but there is no agreed mapping standard.

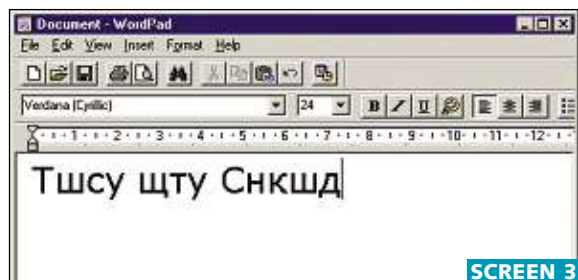
This means exchanging documents between the users of different word processors can result in an 8bit Tower of Babel. The Cyrillic capital letter Ya – the one that looks like a back-to-front R – has a permanent home at 042F in the Unicode range. However,

## Standard Ascii characters with hexadecimal codes

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2	SP	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL

Note: To find the hexadecimal code for an Ascii character, eg DEL, find it in the table, take the corresponding figure in the left-hand column (7), and in the top row (F). The result is 7F

YYePG Proudly Presents, Thx for Support



in the WP Cyrillic A font, it lives at 0061 (hex), a lodging it shares with the one-third fraction in WP Typographic Symbols and the letter 'a' in the Ansi and Unicode sets.

The other issue is one of typographic aesthetics. Although it may sound nonsensical to speak of 'Times New Roman Greek', sets of Greek glyphs created to match individual fonts are going to be far more elegant than a 'one-font-fits-all' range, as well as providing gainful employment for type designers.

### The mythical Unicode

The Unicode standard, which has been under development since 1988 by partners as diverse as Apple, Microsoft, IBM, the Swedish Royal Library, Reuters and the Mormon Church, solves the problem at a stroke. Instead of one byte to encode each character, it uses two, increasing the number of available slots from 256 to 65,536, which is more than enough to encode every character in every written language currently in use. Note that Unicode is solely a standard – it's up to developers to provide the technology to create or display the actual fonts – and as such it is completely independent of applications and platforms.

The standard is still under development, but the current version (4) includes most living languages, as well as those of historical interest such as Egyptian hieroglyphs and Linear B. A proposal to include Klingon was formally rejected in 2001. Although there's a price to pay in file size, this isn't really significant compared with the multi-megabyte sound, image and video files that are now the norm.

Word for Windows has embraced Unicode since version 97, but this was only partly reflected in the versions of the operating system. The core fonts shipped with Windows 98 and later versions of 95 contained what Microsoft calls the Windows Glyph List (WGL4). (A glyph is used to mean the depiction of a character in a particular font – an upper-case W in Arial and Times is the same character but different glyphs.) It's

**It's hard to obtain individual glyphs in Wordpad**

## More headers and footers

In January's column, we said that getting a header and footer on the first page of a document with just a footer on subsequent pages was easy. Not in Open Office it isn't, replied John Clarke. He teaches basic computing skills at a village access point, largely to older users on hand-me-down computers using Open Office. The only way he had been able to do this was to first create a document in Word and then open it in Open Office.

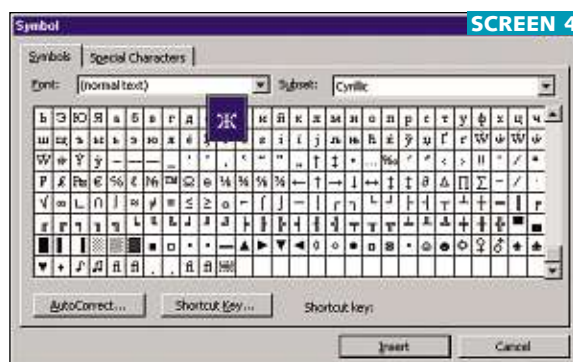
The solution is a feature found in Open Office and Staroffice, but not Word: namely Page Styles. Go to Format, Styles, Catalog, then choose Page Styles from the drop list at the top. You will then be able to either modify the existing styles or create new ones. If you are doing the latter, create the Page Style for

subsequent pages first. In either case you'll get a tabbed Page Style dialogue. On the Organizer give the style a name – for example, Continuation – and make sure the Next Style is also set to Continuation. You can then enable or disable headers and footers from the appropriate tabs.

Repeat the process for the existing Firstpage style (or create a new style with a different name), making sure the Next Style is also set to Continuation, and setting the headers and footers accordingly. OK out of both dialogues, then use Format, Stylist to apply the desired Page Styles to a document. Note that the icons top-left of the Stylist work as tabs, giving you access to Paragraph, Character, Frame, Page and Numbering styles.

impractical for a font to contain a glyph for every Unicode character – this would result in huge font files. The 655 glyphs in WGL4 included, as well as the Basic Latin and Latin-1 sets, the Greek and Cyrillic alphabets and Latin Extended ranges that include modified glyphs used in eastern European, Turkish and Scandinavian scripts. Getting at them was another matter.

**Word 97 gives you a wide range of glyphs**



You couldn't see them in the Character Map – this was only for NT 3.1 and its successors 2000 and XP. There is a workaround in Windows 95 to ME involving code pages, but this means changing the keyboard language – you can't easily get hold of individual glyphs in Wordpad, (see screen 3). Word for Windows 97 and later offers access to the entire range via the Insert Symbol dialogue (see screen 4). Since WGL4, Windows core fonts have been extended to include Hebrew and Arabic.

Other software companies have been less astute in rising to the challenge of the non-Latin market. Lotus and Ability are still without Unicode. Wordperfect has only just embraced the standard in version X3, but Open Office (and its commercial sibling Staroffice) and the Java-based cross-platform Thinkfree are fully Unicode-aware. **PCW**

## A better solution to a chess problem

In March's column, we discussed a solution for Ollie Killingback's problem of stripping unwanted information from a chess game filed in portable game notation (pgn) format. To recap, these take the form 1. e4 {[%emt 0:00:02]} d5 {[%emt 0:00:01]}, where the data between the curly brackets (which denotes the time taken for each move) needs to be removed. At the time, I stated that you can't use wildcards and try to find curly brackets as

they have a specific wildcard meaning. Instead I suggested the alternative of searching for a string of 14 'any characters' enclosed in curly brackets. Reader Alan Farr pointed out that I was wrong, and provided a far more elegant solution. You can, indeed, use curly brackets with wildcards turned on if you precede them with a backslash in order to denote a 'literal'. So my inelegant search string can be replaced with just five characters, namely `\{\*\}`.



**Stephen Wells** is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

→ Comments welcome on the Spreadsheets column.

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# The lowdown on dropdowns

A reader's problem with linking lists is solved; plus some neat tricks with the Shift key

Reader Stephen Hanslip writes: 'In my diocese I have several deaneries – say 10. Each has a number of different parishes – say 10 again. I can easily make a dropdown list that allows me to pick a deanery, and I can do the same for the parishes – but only with all 100 of them. How do I make the second list dependent on the first, that is, show only the parishes in the deanery that I have selected?'

This is a problem that is equally relevant to secular applications such as commercial product groupings, so it's well worth looking at here.

For a single dropdown box, you would normally start with one from those offered on the Forms dialog box or Control Toolbox, but with two that are dependent on each other it's much easier to use the Data Validation feature of recent versions of Excel.

To give a fictitious example, I'll use four deaneries, each with four parishes and, as it's easy to do, I'll include a pastor for each parish. This data is listed on a worksheet of its own, as in screen 1. Change the tab name to List. The fourth field, Validity, is a necessary shortlist of the four deaneries. At this stage, change the tab of another blank worksheet to Form.

Did you know Names could also be formulas? The methodology here is wholly dependent on that, so five Names are prepared next. On the Insert menu choose Name, Define, then in the top box enter Deanery and in the bottom box enter:

```
=OFFSET(List!$A$2,0,0,COUNTA(List!$A$1:$A$17),1)
```

(Key: ↵ code string continues)

Make another Name, Parishes (see screen 2) and in the Refers to: box enter:

```
=OFFSET(INDIRECT(ADDRESS(MATCH(Pick1,Deanery,0)+1,2,,,"List")),0,0,COUNTIF
```

	A	B	C	D	E
1	Deanery	Parishes	Pastor	Validity	
2	North	St Martin's	M Bailey	North	
3	North	St John the Lesser	B Callaghan	East	
4	North	Our Lady of Light	C Curtin	South	
5	North	St Gregory's	J Dawson	West	
6	East	St John the Baptist	C Eyles		
7	East	All Saints	C Frost		
8	East	All Souls	E Grace		
9	East	St Anthony's Chapel	J Harding		
10	South	Corpus Christi	U Judge		
11	South	Immaculate Conception	I Kelly		
12	South	St Antony of Padua	K Lyons		
13	South	St Teresa	B McGraph		
14	West	St Luke	J O'Brian		
15	West	St Bede's	A Roche		
16	West	St Cedd	V Shalvey		
17	West	St Thomas More	M Turner		
18					
19					

SCREEN 1

(Deanery,Pick1),1)

Make sure you have all the 10 brackets and 11 commas in the right places.

The last three required Names are short. Create the Name, Pick1 and give it the formula: **=Form!\$C\$5**.

Create the Name, Pick2 and give it the formula: **=Form!\$E\$5**.

Create the Name Validity and give it the formula: **=List!\$D\$2:\$D\$5**.

Now go to the Form worksheet. Add the headings Diocese, Deanery, Parishes and Pastor in cells E2, C4, E4 and G4 respectively. Choose cell C5 and Validation on the Data menu. Under the Settings tab in the Data Validation box click the down arrow next to Allow: and pick List. In the Source: box enter: =Validity. Ignore everything else and click OK.

**Top: The database supporting the list boxes form**

**Bottom: Creating a Name for the parishes**

Choose cell E5 and repeat the above, except in the Source: box enter: **= Parishes**.

You may see a false error message because you haven't finished yet. Click Yes to continue.

In cell G5 enter: **=VLOOKUP(Pick2,List!B2:D17,2,FALSE)**

Screen 3 shows the result. The range List!B2:D17 is the part of the table with the parishes, pastors and Validity.

All that's left is to format to taste, including a background design for this worksheet. You can choose Options, View on the Tools menu and get rid of the gridlines and column and row headings if you don't want your form to look like a spreadsheet. You could also remove the Formula Bar via the View menu. Save the file.

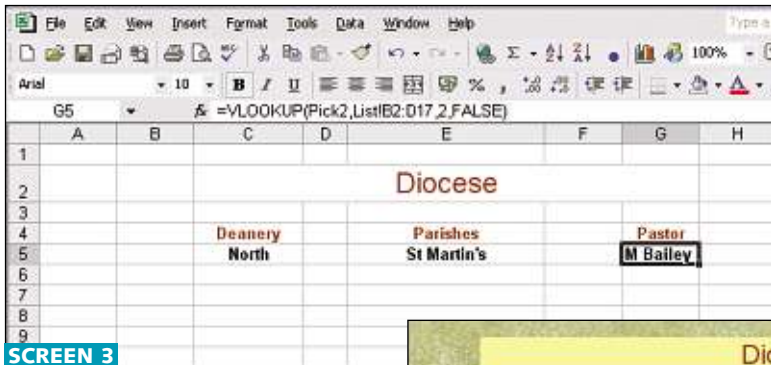
If you click on cell C5 an arrow will appear and you can choose your deanery. Click on cell E5 and the dropdown list will include only those parishes in the selected deanery. Choose a parish from the list and the pastor for that parish will be displayed in cell G5 (see screen 4). If you've bought the DVD edition of PCW, you'll find the completed file, ListBoxes.xls, on the cover disc or go to [www.pcw.co.uk/2151344](http://www.pcw.co.uk/2151344).

## Don't be shiftless

For every print-producing key on a standard manual typewriter there was an equivalent hammer with two characters, one above the other. The second character hit the ink ribbon when the carriage was raised by the Shift key. On today's computer keyboards the Shift key is far more hard-working, particularly in Excel.

It increases the number of shortcut keys you can use for running a macro, for instance. Ctrl & P is used by default for printing a worksheet, but if you have a macro that changes printers you could use Shift & Ctrl & P to start it.

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SCREEN 3

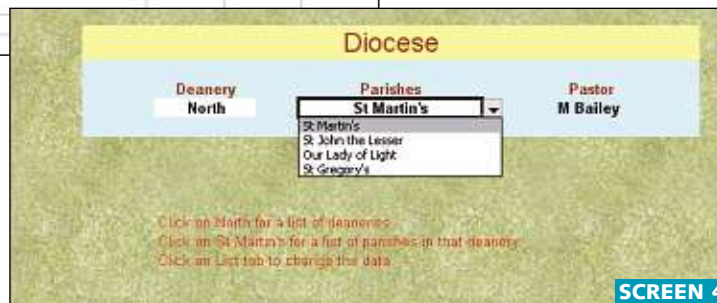
Excel often uses the Shift key as a 'go back' command. When a dialogue box is open, the Tab key will take you forward through the available options. Shift & Tab will take you back through the options. If a dialogue box has tabs you can choose the next tab using Ctrl & Tab. To choose the previous tab press Shift & Ctrl & Tab.

Frequently the Shift key will offer variations on default shortcuts. Enter a number in a cell then press Ctrl & 1. The Format Cells dialogue box will open with General Category under the Number tab selected. But if you press Shift & Ctrl & 1 your number now has two zero decimals added. Open the Format cells dialogue box again and you'll see that the Category has been changed to Number with two decimal places.

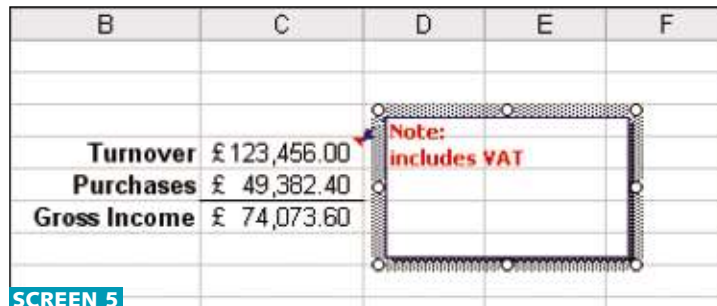
Another shortcut variation is for selecting a range. If you are down in the right-hand corner of a worksheet, Ctrl & Home will jump you back to cell A1, but Shift & Ctrl & Home will highlight all the cells from your current location back to cell A1. If you use Ctrl & spacebar to select all the cells in a column, be aware that Shift & spacebar will select all the cells in a row.

If you select a cell and press the Delete key, that cell is emptied, but if you press Shift & Delete the value is transferred to the Clipboard so you can then Paste it into another cell. (It's like pressing Ctrl & X). If you press the down arrow key, the focus will move to the cell below the current one. If you press Shift & down arrow, the current cell and the one below are selected.

The Shift key can provide alternatives to function key uses. F2 offers you editing in a cell instead of the Formula Bar. But Shift & F2 opens the Comment editing box (see screen 5). F3 offers available Names to paste into a formula. Shift & F3 will offer functions to put into a cell. F5 will display the Go To dialogue box. Shift & F5 displays the Find and Replace dialogue box. F10 takes the focus to the Menu toolbar; Shift & F10 opens a



SCREEN 4



SCREEN 5

**Top: Two list boxes are shown, one dependent on the other**

**Bottom: Shift & F2 is for editing comments**

shortcut menu. (It's an alternative to pressing the right mouse button.) F11 opens a new Chart sheet. Shift & F11 opens a new worksheet. F12 shows the Save As dialogue box. Shift & Ctrl & F12 displays the Print dialogue box.

The Shift key can also offer variations on menus. The Edit menu normally offers Copy and Paste, but press Shift when you select the Edit menu and those options are changed to Copy Picture and Paste Picture.

After entering a value in a cell, you normally press Enter to record the entry and move to the cell below. But if you press Shift & Enter, Excel records the entry and moves you to the cell above. A variation is to first select

**Left: The VLOOKUP function finds the right pastor**

Options, Edit, Settings on the Tools menu and choose 'Move selection after Enter Direction: Right'. This does what it says, unless you press Shift & Enter when the focus will move left.

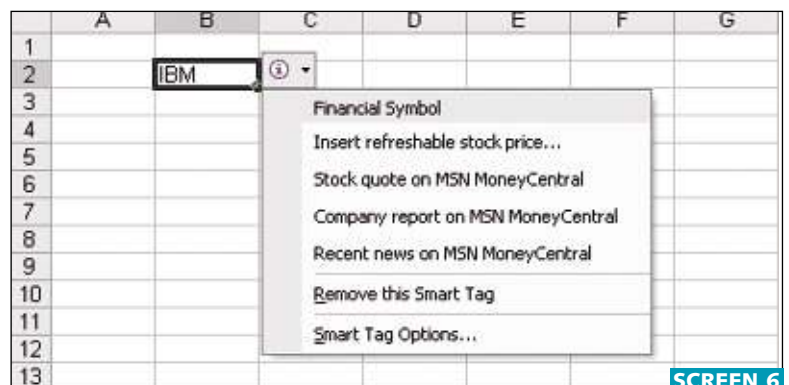
I often mention array formulas in this column. They act on two or more sets of values known as array arguments. Instead of using just Enter to record these formulas, you must press Shift & Ctrl & Enter. Excel acknowledges that this is an array formula by adding curly brackets, {}, around the formula.

Normally, if you want to make more tools available, you create a new Toolbar. But you can make space on the standard toolbar by removing some of the usual tools. You can remove the Open tool, for example, and use Shift with the Save tool instead. The Print Preview tool changes to the Print tool if you hold down Shift when you select it.

Holding down the Shift key while an Excel file is opened will abort any macro otherwise designed to run automatically at that point.

Here are a couple of obscure uses of Shift. If you select several rows – by highlighting their row numbers on the left – and press Ctrl & 9, those rows will be hidden. Now press Shift & Ctrl & ( and those rows will be displayed again. Shift & Alt & F10 displays a menu for a smart tag (see screen 6).

And one of my favourites is for inserting today's date in a series of contiguous cells prior to making accounting entries. Highlight the range, say A5:A20, then press Ctrl & ; (semi-colon) immediately followed by Shift & Ctrl & Enter. **PCW**



SCREEN 6

**Shift & Alt & F10 displays a menu for a smart tag**





**Niall Magennis** has been dabbling in Midi and digital audio since the days of the Atari ST. He writes for a number of music magazines and lives in London in a flat overrun with music equipment.

→ Comments welcome on the Sound column. It returns in the August issue. Email [sound@pcw.co.uk](mailto:sound@pcw.co.uk) Please do not send unsolicited file attachments.

# Shift and stretch your audio

Get to grips with time stretching and pitch shifting using Cubase's Audio Warp tools

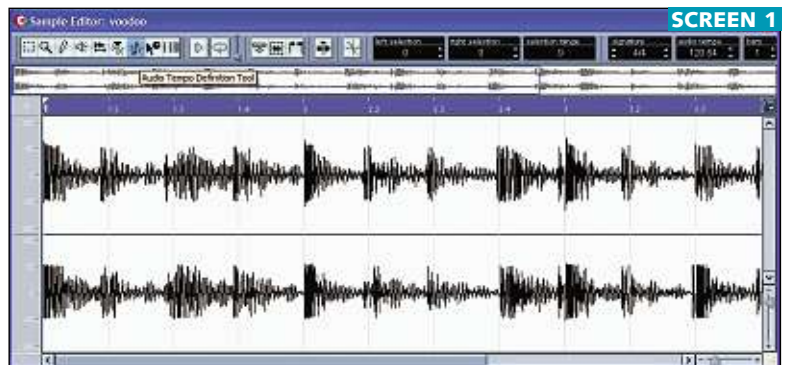
**T**he likes of the Beatles and the Beach Boys were the first to use the studio as a kind of instrument in its own right, rather than just a place to record, but today pretty much every musician uses the studio as a creative tool. There's barely an album or single that makes it into the charts that hasn't been played around with in one of the big virtual studio packages.

Much of this work involves pitch shifting or time stretching pieces of audio, because a lot of production time is spent on making things fit together seamlessly. You may need to fit a guitar loop over a drumbeat, match up a piano part with a string section or even timestretch a whole vocal line so it fits over a new backing track.

However, even though Cubase has been one of the biggest and most used virtual studio packages around, its time-stretching and pitch-shifting tools could never really be described as being intuitive to use. Whereas the likes of Sony's Acid and Ableton's Live make it

a cinch to pull and push the tempo and pitch of a piece of audio into place, with Cubase you felt like you had to hammer and chisel your way through the process. In fact, the laborious nature of the time-shifting and pitch-shifting tools often acted to sap you of creativity.

Thankfully Steinberg finally solved many of these problems in Cubase SX3. It has rejigged the time-stretching and pitch-shifting tools and gathered them together under the Audio Warp name. The Audio Warp tools let you match the tempo of any audio recording to the tempo of the project; quantise an audio track to improve its timing; fit an audio recording with strict timing to match a project with a fluctuating tempo; or pitch-shift lots of differing audio clips in real time.



**You use the audio tempo definition tool to tell Cubase the tempo of your loop**

In this month's column, we're going to look at these new tools to show you how to use them to pitch shift and time stretch audio in your own projects. You'll need Cubase SX3 to follow our tips, as these tools aren't available in older versions of the software.

## Getting started

To get started, you need to load in one of your existing projects that has a tempo of 120bpm (beats per minute) or similar. We're going to add elements to this project to help show you how you can use the new Audio Warp tools to change the tempo and pitch of samples in your own musical pieces.

Once you have the project loaded up in Cubase, you need to import a sample you can use for this time-stretching tutorial. Choose a sample that doesn't match the existing tempo of the project. For this exercise, it's best to use a drum loop that's one bar long, so select the Open Pool window in the Pool menu and click on the Import button. Use the file browser to find a suitable drum loop and then click on the Open button. Once the loop has been imported, you need to add it to an empty track in your project.

Now it's time to start changing the tempo of the sample. In the project window, double-click on the same loop to open it in the sample editor. At the top of the sample editor window, you'll

## Changing the pitch

You can use the Audio Warp features to pitch shift audio in the Project window. To do this, just select the piece of audio you want to transpose and then click on the Show Event Infoline button. In the

transpose box that appears at the top right of the display, input the value by which you want your audio pitch shifted. Cubase will then process the audio so it plays back at the correct pitch.



Use the Event Infoline to transpose samples

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see three boxes. They are marked Signature, Audio Tempo and Bars and Beats. They are all greyed out because they're not yet enabled. To enable them, you need to click on the Audio Tempo Definition button that is represented by a note symbol sandwiched between two arrows (see screen 1).

As soon as you press the Audio Tempo Definition button, SX will try to help by pre-filling the Signature, Tempo and Bars and Beats boxes with suggested values based on the length of the sample. These suggestions can sometimes be a bit off. You'll be able to tell by ear whether Cubase has guessed correctly the number of bars in the beat. If it hasn't got the right value, enter the correct number in the Bars box. Once this field is filled in, you can move on to enabling Cubase's automatic time-stretching tools.

Cubase now knows how many bars make up your sample and what tempo the beat is running at. However, it's not currently using the information to time-stretch your beat. To change this, you need to click on the Musical mode button – it's the button located to the right of the hit point sensitivity slider with the music note icon on it. Once you've turned on music mode, hit the Play button and you'll hear your beat play back perfectly in time with the rest of your project. Even if you change the overall tempo of your project, the loop will automatically adjust to the new playback speed.

However, if you speed up or slow down the tempo of the project by too much, the loop will start to sound unnatural and overly processed. Cubase can use different algorithms to stretch and shorten the sample. So, when you're working with extreme tempo changes, you can sometimes improve the quality of the stretched audio by changing to a different algorithm. To try changing the method Cubase uses to stretch the loop, click on the dropdown menu to the right of the Musical mode button. From the dropdown list, select Drums, and the time-stretched loop should now start to sound a bit less processed, taking on a more natural quality (see screen 2).

### Quantising audio

Another neat feature of the Audio Warp tools is that you can use them to quantise audio that has already been recorded. First, take a piece of audio you want to quantise and place it on a track in the main project window. Now double-click on it to open it in the

It's easy to change the mode that Cubase uses to stretch your loops

## Automatic time-stretching

If you're using samples that you know have already been trimmed to the correct loop length (such as those from an Acid samples disk) or if you're just the type who always trims their samples to the correct length for looping, then Cubase can generally automatically guess the right time-stretching settings without you having to intervene. To try it out, load a sample that you know is perfectly looped into the Audio Pool.

Have a look next to the file you've just loaded in and you'll see that there is a column labelled Musical. If you tick this box next to your sample, a window will pop up asking you to enter the tempo of the loop. However, SX will have already correctly guessed the tempo and helpfully filled in the value in the box, so all you have to do is

click on the OK button. Now if you take this sample and plonk it on a track in your project, the loop will automatically be time stretched to the correct tempo. If you know your loops are trimmed correctly, this saves you the hassle of having to open up loops in the sample editor to set their tempo values.



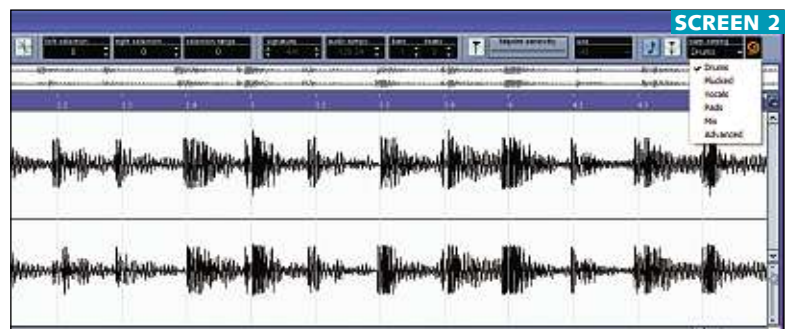
You can quickly turn on music mode in the Audio Pool Window

sample editor, then activate the Audio Tempo Definition tool. Enter the tempo for the sample, then click on the button to the right of the Hit Point Sensitivity slider to turn on Musical mode. With Musical mode turned on, click on the Hit Point mode and in the Use box choose the Quantise value you want.

From the Audio menu, select 'Calculate Hitpoints', then choose a relevant preset from the menu. For example, if it was an acoustic guitar sample, you might select plucked. Click on the Process button to instruct Cubase to search for the Hit Points in the sample. You can use the sensitivity slider to adjust the number of hit points Cubase picks out in the sample. If you need to mute an unwanted hit point, select the Hit Point Tool, hold down the Alt key and click on the unwanted points. To add extra points, make sure the Hit Point tool is selected, hold down the Alt key and click in the middle area of the sample to create a new hit point.

Once you've finished creating the hit points, you need to click on the audio menu, choose Realtime Processing and then Creative Warp Tabs from Hitpoints. This allows Cubase to set the regions it will use to push and pull the audio when it is quantising. Close the sample editor and then, in the Project window, select the piece of audio you have been working on. In the Quantization Type box, select the quantisation value you want to use, then click on the Audio Menu and select Realtime Processing then Quantize audio. Cubase will now correct the timing of the audio loop.

Hopefully we've given you a good idea of how the Audio Warp tools in Cubase work. They're still not as intuitive as they should be, but they are a big improvement over what went before. While they're initially a little tricky to get used to, with a bit of practice, using them becomes second nature. PCW



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**Alan Stevens** has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

→ Comments welcome on the Networks column.

Email [networks@pcw.co.uk](mailto:networks@pcw.co.uk)

Please do not send unsolicited file attachments.

# Get the message through

Follow this workshop to find out how to install and configure an email server

**A**s promised, this month's column is a workshop, looking at what's involved when it comes to installing and configuring an email server on a home or small-business network.

The examples in our workshop show the setup of a Windows-based package called Mailserver6 from Kerio ([www.kerio.co.uk](http://www.kerio.co.uk)) available from £327.82 (20 users), although there are lots of other products you could use, including open-source software. The exact details will, naturally, differ depending on the software involved, but the basic principles are the same no matter what you use.

## Sizing the hardware

Of course, the first thing you'll need is some kind of PC to host your mail server, but it doesn't have to be very powerful. The minimum required for the Kerio software is a PC with a 500MHz processor and 256MB of Ram, running Windows 2000, XP or Server 2003.

## 'You can download a full copy of Mailserver6 from the Kerio website and evaluate it for 30 days before deciding whether to buy it'

Neither does it have to be dedicated to the task: if you have an existing file server, it makes sense to use it. Just check that it's not being hammered by anything else (you can check this with Task Manager) and appreciate that you'll need to allocate extra space for user mailboxes, which may mean upgrading or installing extra hard disks.

For the examples here, I've installed the Kerio software onto an old Pentium III PC with 512MB of memory and a 40GB hard disk running Windows 2000 Server. And



according to Kerio, that should be more than sufficient to host mail for a company of up to 20 users, although a bigger disk might be needed as you get to the top of that number.

## Installing the software

As with most small business mail servers, you can download a full working copy of Mailserver6 from the

Kerio website and evaluate it for 30 days before deciding whether to buy it.

Installation starts with an Installshield wizard that steps you through the basic copying of the software onto the Windows host, with the mail server configured as a background service that will start automatically when the PC is turned on. The Installshield utility then calls a second wizard to configure the mail server for your domain and add

User aliases mean fewer changes when users are away or change job

**On a private intranet any domain name will do, but to send and receive over the Internet the mail server needs a fully qualified domain name and DNS records pointing to it**

a user account with administrative rights, to later continue the setup and manage the software.

I've used pcw.local as the domain name in screen 1 as I'm only using the server on a local intranet. However, to send and receive Internet mail, a fully qualified domain name needs to be specified.

That name may be provided to you as part of your Internet package (for example, yourname.yourisp.com) or you may

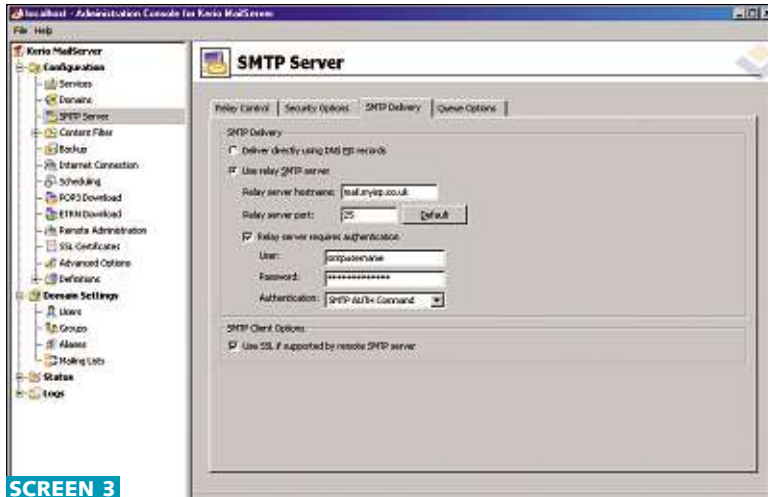
have registered your own, typically, in the format yourname.co.uk. Either way, be aware that if you want mail delivered directly to the server you'll need to make sure that it's accessible from the Internet (that is, not hidden behind a network address translation (Nat) firewall) and that there's a public DNS MX record configured for the domain name you're using. Your ISP can normally arrange this last requirement for you.

And that's it as far as basic setup is concerned. Having run the install wizard you should have a fully working SMTP (Simple Message Transfer Protocol) mail server that can be used to send and receive mail



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on the local network. You will, however, have to set up user accounts before that can happen, and configure the client software. Plus, depending on the type of connection, other changes may be required to allow the server to send and receive messages over the Internet.



SCREEN 3

**Configuring users**

The management console in Mailserver6 is typical of the kind of interface provided to manage a mail server, with an Explorer-like control tree down the left and more detailed menus alongside. Most of these menus are very straightforward and easy to follow, such as the user

menu where, on a small network, details such as user name, password and so on can simply be typed in. This can take a while, so on a larger Lan the information can be imported from an existing Windows NT domain, Active Directory or Novell server. There's also the option of authenticating users directly against

**Outgoing mail can be delivered directly to the recipients or forwarded to your ISP to handle**

**'Outgoing mail can be addressed to a mailing list'**

Windows Active Directory or using LDAP (Lightweight Directory Access Protocol) with the LDAP server included in the Kerio package.

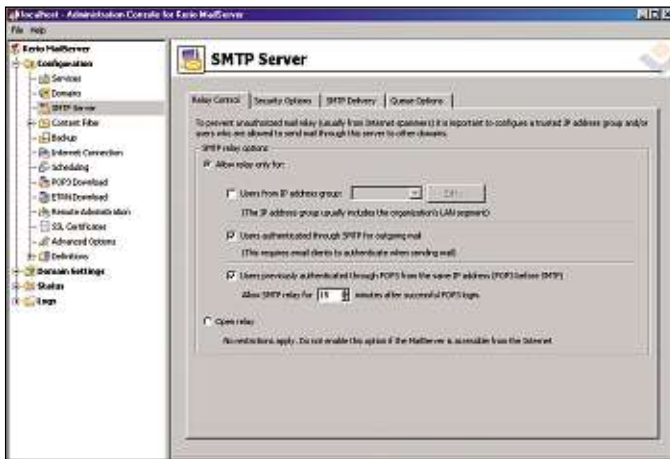
Users can be assigned to groups and have quotas set in terms of both how big their mailboxes can get and the size of messages they're allowed to send or receive, with user aliases another useful option. For example, you could create a mail alias of **information@my.domain.com** to which general enquiries could be sent, perhaps via a website form. That alias can then be forwarded to one or more actual users (see screen 2), making it a lot easier to cope with staff changes, sickness, holidays and so on.

The Kerio package also includes a list server, which can be used to automate things such as mailshots and newsletters. Using this, outgoing mail can be addressed to a mailing list rather than the individuals concerned, the list server working out who should be sent the message and dispatching copies automatically. Potential recipients can also subscribe or unsubscribe themselves using email embedded commands or links from a website.

**Send/receive options**

Depending on how you're connected, you may have to tweak the settings that control the way messages are sent and

**Delay your relay worries**

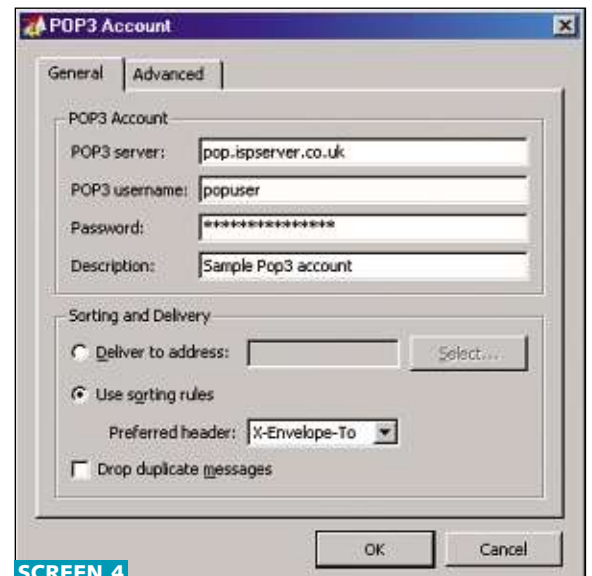


Most mail servers have to be explicitly configured to be an open relay and you should only do so where the server is inaccessible from the Internet

The biggest security concern with a publicly accessible email setup is possible hijacking of the server to relay spam. To this end most email server software will, by default, only relay (that is, forward) messages from clients on the same local network. However, this can be fine-tuned with controls to more precisely identify users before they're allowed to send mail via the host server.

For example, Mailserver 6 normally requires users to provide

a valid account name and password before they can send messages, something which can be configured in the mail account settings when using Outlook as the email client. The Kerio server can also be set up to allow users to send messages if they've previously retrieved mail using Pop3. Plus there are facilities to configure a range of known IP addresses from which messages can be sent.



SCREEN 4

With a dial-up or ISDN Internet connection, Pop3 retrieval of incoming messages may need to be configured



received over the Internet. Sending isn't that much of an issue, as all mail servers use SMTP to do this, and it doesn't matter if you're using dial-up or ISDN. However, you will need to choose between sending directly, with the mail server resolving addresses via DNS, and simply forwarding all outgoing mail to your ISP for its servers to handle (see screen 3).

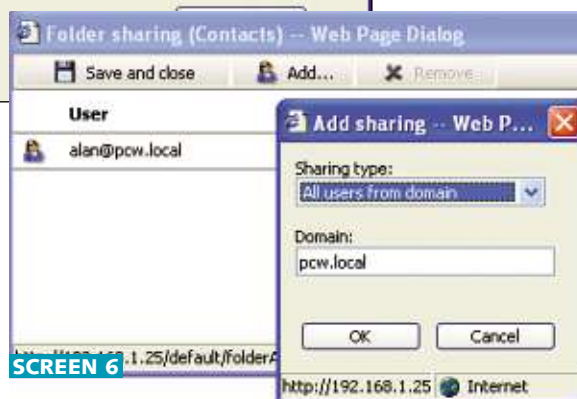
When it comes to receiving mail, however, life gets a little more complex. You can, again, use SMTP with – assuming always-on Internet connectivity and suitable DNS entries – incoming messages pushed directly to the server.

For Pop3 mail, however, you'll need to tell the mail server where to get the messages from, provide an appropriate username and password and, in most cases, set up a schedule to check for and download waiting mail (see screen 4).

SMTP delivery is the most efficient approach, but it is not always convenient; for example, where the mail server is hidden behind a Nat firewall or you only have dial-up or an ISDN connection to the Internet. In this case, you can use Pop3, although not all mail servers provide this facility so check before you buy. Plus, you'll need a multi-drop mail account with your service provider, typically where you're allowed as many email addresses as you want and don't have to supply the details of each user separately.

## Client setup

Having got your mail server working, you then have to configure the clients, and what's required here will vary depending on the application and type of mailbox involved. The basic



**Web clients get a global address book and can share local folders, but Outlook users need a special connector to support these groupware options**

**A shared mail server makes it possible to filter out viruses and spam centrally, rather than having to protect every client individually**

**Clients will need to be configured to send and receive messages via the network mail server**

(Internet Message Access Protocol) mailbox on the server.

Mailserver6 supports both approaches, and includes a web-based client that can be accessed from a browser. However, unlike some other packages, you don't have to specify the type of mailbox on the server itself, just at the client end.

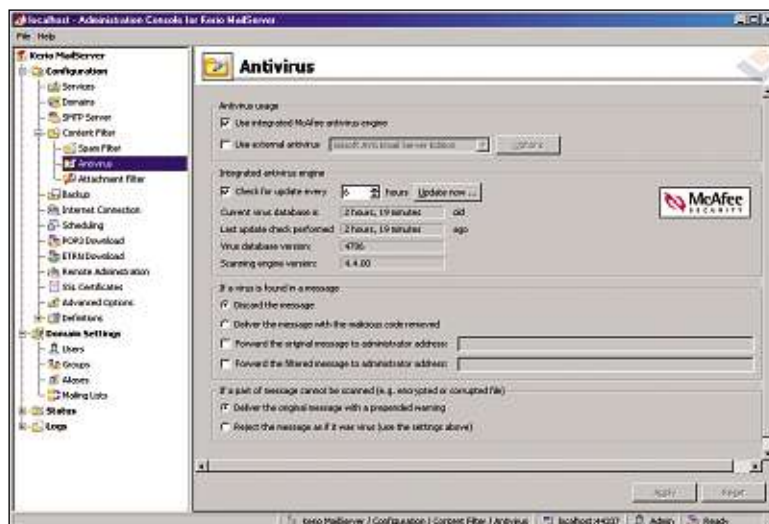
Note too that the Kerio software includes groupware functionality, giving users access to a global address book and allowing them to share their local contacts, calendars and task folders.

This functionality is available immediately via the web client (see screen 6) but, because it relies on the Mapi (Mail API) protocol used by Microsoft's Exchange Server, additional setup work is required if you're using Outlook. Indeed, you have to install a custom Outlook Connector (supplied with the email server) on each client PC and configure Outlook to use this to connect to the mail server.

## Other options

Finally, most mail server packages include facilities to centrally apply and manage anti-virus, anti-spam and other security tools. Mailserver6 is no exception, with built-in McAfee anti-virus protection plus a range of anti-spam and more general content-filtering options, including attachment blocking (see screen 7).

You can also add disclaimers on the bottom of all outgoing messages, monitor and log all activity and generally stay on top of your mail server. Then, once you're happy with the setup, all that remains is to license it and get on with your work. **PCW**



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**Mark Whitehorn** is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars.

→ Comments welcome on the Databases column.  
 Email [database@pcw.co.uk](mailto:database@pcw.co.uk)  
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# An argument with a point

How poor indexes can slow down your queries; plus what makes a crosstab furious

Last month we were looking at indexes (indices if you really insist) and how they can speed up access to the data in large tables. When the tables are relatively large (in Access terms that's about three million rows of data on a machine with 1GB of Ram) then Access will use the indexes. When the tables are small (half a million rows on the same machine), Access will often 'choose' not to use the indexes.

This sounds counter-intuitive but the reason is simple. Tables of this size, on a machine with that amount of Ram, can be read entirely into memory, and the data accessed so rapidly that using the index would slow down the process.

However, last month I left you with a quandary. Assume that we have a three-million-row table. The Quantity column is indexed and contains mostly values of one, two or three. Only three rows from the three million rows contain the value 40. This query:

```
SELECT Quantity
FROM [Order Info]
WHERE Quantity=40;
```

makes use of the index, runs in less than a second and returns those three rows. This query:

```
SELECT Quantity
FROM [Order Info]
WHERE Quantity Not In (1,2,3);
```

returns exactly the same three rows but it takes five seconds to run, which tells us that it was unable to use the index. The question is, why not?

## Looking for an argument

The technical answer is that the first query uses what is called a 'searchable argument', whereas the second is using a non-searchable argument. Great, but what does it mean? Well, as intelligent human beings, you and I can intuitively understand that these two queries are logically the same. We

**Names : Table**

NameID	Name
1	JD
2	JS
3	AJ
0	

**Times : Table**

TimeID	NameID	Date	Time
1	1	29/01/2006	14:15
2	1	30/01/2006	12:10
3	2	31/01/2006	09:30
4	3	01/02/2006	15:10
0	0		

reason that if the Quantity field is known to contain only four values (one, two, three, four) then asking for the values that are not in the set (one, two, three) is the same as asking for those that are equal to four. The database engine is not intelligent and it cannot work this out. So, in order to solve the second query, it cannot simply use the index to look for the rows that contain four. Instead, it has to adopt a brute force approach and examine every row in the table to see if the value it contains is a one, two or three. If the row doesn't contain any of these values, then the row is returned by the query. The end result is the same as the first query, but the second query takes longer to run.

Why am I telling you all of this? Because it illustrates the point that, even though indexes can speed up the access to data dramatically, that isn't the full story. The world's most

**These two tables contain data from which the crosstab is constructed**

**This unsatisfactory crosstab query does not return all names from the Names table**

elegantly indexed database can still run slowly if the queries are badly designed.

## Furious tabs

Phil Cook contacted me about a crosstab query. A simplified version of his two Access 2000 tables look like screen 1, and from these he produces a crosstab query that displays a subset of dates (29/1/06-31/1/06 inclusive), with names and the times associated with them, as shown in screen 2. The query works fine, but it isn't exactly what Phil wants as he needs to see every name even when no time has been allocated to that person. In this specific example, AJ is missing from the crosstab because the only data for him is outside the dates specified in Phil's query.

A good general strategy for solving a problem like this is to break it down into smaller steps and solve them one at a time. So, first we'll write a select query that filters out the data we want from the two tables (see screen 3); that is, all rows where the date is in the required time period. (If you've bought the DVD edition of PCW, you'll find both this query, PerformTheFilter, and the database DBCJUN06.MDB on the cover disc. It can also be downloaded from [www.pcw.co.uk/2151344](http://www.pcw.co.uk/2151344)).

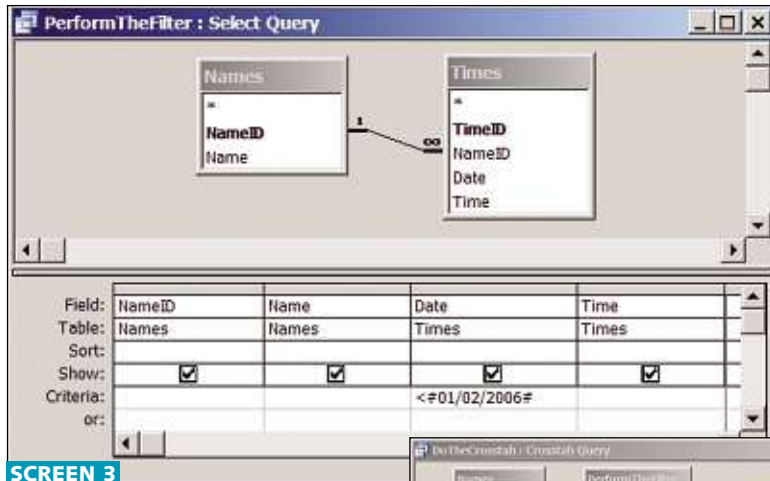
The SQL code for this query is:

```
SELECT Names.NameID,
Names.Name, Times.Date,
Times.Time
FROM [Names] INNER JOIN Times
ON Names.NameID = Times.NameID
WHERE (Times.Date<#2/1/2006#);
```

(Key: ⌘ code string continues)

**Query1 : Crosstab Query**

Name	29/01/2006	30/01/2006	31/01/2006
JD	14:15:00	12:10:00	
JS			09:30:00



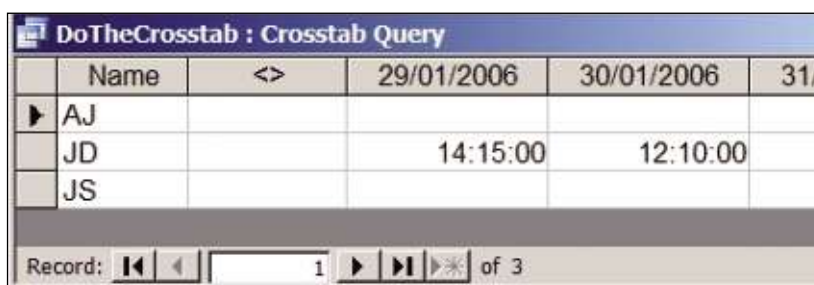
SCREEN 3

Then we can base a crosstab query on this subset of the data. Crosstab queries require three columns. These then act as the row headings, column headings and the actual values that appear in the crosstab grid. To duplicate Phil's display we'll want to use Name as the Row Heading and Date as the Column Heading, with Time supplying the Value.

However, if we simply use these three columns from the query above, we won't get the full set of names, so we will be duplicating Phil's problem rather than solving it. However, we know there is a complete list of names in the original Names table. We should, therefore, start the design process for this next query by including the Names table in the query grid, as well as the answer table generated by the PerformTheFilter query.

Now we have access to all the data we'll need. Make the query a crosstab by selecting that option from the Query Type button on the top button bar. Add in the Name field from the Names table and the Date and Time fields from PerformTheFilter. In the Crosstab row of the query, set Name to act as row headings, Date as column headings and Time as the value, as described above.

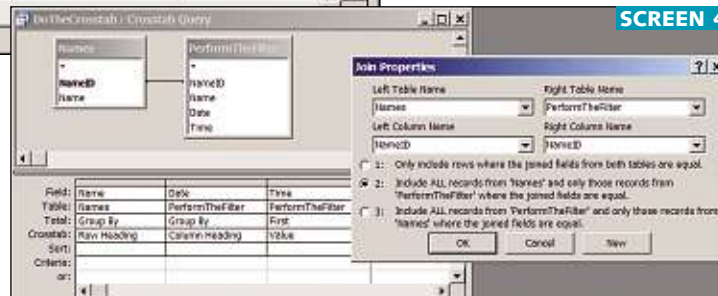
In the Total row of the query, the columns chosen as row and column headings must remain set to Group By, but set the column containing values



SCREEN 5

Left: The first step is a select query to find all records on the required dates

Below: Changing the join properties to ensure all records from Names are included in the crosstab



SCREEN 4

to First. If you try running the crosstab at this point you'll get the same incomplete list of names that has been plaguing Phil. We need to specify explicitly that we want all the Name records from the Names tables, regardless of any other consideration, such as whether they appear in the PerformTheFilter answer table.

In the upper portion of the query you should see a line running between the two tables. This represents the join between the NameID fields in both tables. Double-clicking on it opens the Join Properties box. Option two looks ideal, giving all the records from Names (see screen 4). Make the selection, click OK and run the query. Screen 5 shows how it works. The SQL is:

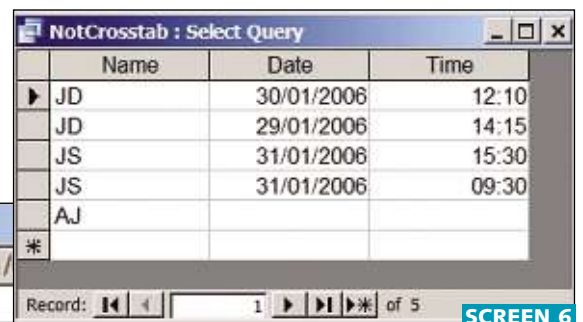
```
TRANSFORM First(PerformTheFilter.Time) AS FirstOfTime
SELECT Names.Name
FROM [Names] LEFT JOIN
PerformTheFilter ON
Names.NameID =
PerformTheFilter.NameID
GROUP BY Names.Name
PIVOT PerformTheFilter.Date;
```

But what's that odd column headed '<>' that has crept in? In a crosstab, whenever Access encounters a null value in the field defining the column headings (Date in this example), it inserts a column headed '<>'. Under normal circumstances you could eradicate this extra column by entering 'Is Not Null' on the Criteria row on the query grid for the column header. But that negates the whole point of Phil's crosstab, because ignoring nulls in the Date column will suppress records with no value and the crosstab will just return rows with Date data – the original and unsatisfactory solution. An alternative approach is to right-click on the '<>' column header and select Hide Columns to do just that.

You can return the same data set without using a crosstab query. Phil's data suits the

crosstab very well because there is only ever one time per date, enabling us to use the First function for determining the values to display in the crosstab. Crosstab queries can only display a constrained set of data, using aggregate functions such as Sum or Count, or the non-aggregate functions First and Last. Given multiple times per date, a select query built in the same way as the crosstab above with a left join will return the records meeting Phil's criteria, though displayed differently (see screen 6). The SQL for this query is:

```
SELECT Names.Name,
PerformTheFilter.Date,
PerformTheFilter.Time
FROM [Names] LEFT JOIN
PerformTheFilter ON
Names.NameID =
PerformTheFilter.NameID; PCW
```



SCREEN 6

Left: The crosstab working as required; note the extra column headed '<>'

Above: The same result can be generated with a select query

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# RIZEON





**Tim Anderson** is an IT journalist and software developer, and began writing for PCW in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet.

→ Comments welcome on the Visual programming column.  
Email [visual@pcw.co.uk](mailto:visual@pcw.co.uk)  
Please do not send unsolicited file attachments.

# A programming revolution

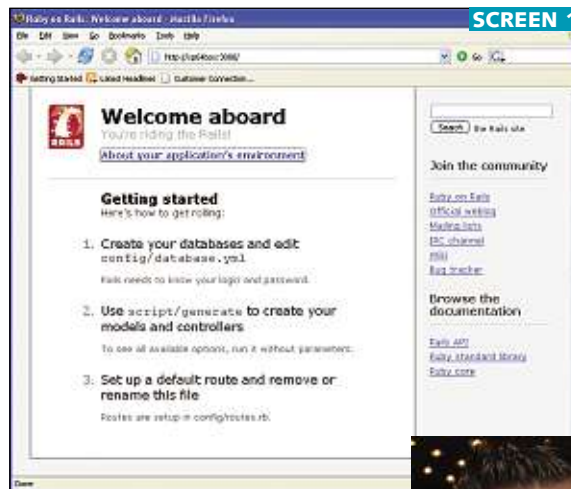
The new wave of dynamic languages is challenging old assumptions about coding

**D**ynamic languages are in. For programmers who have kicked around a bit, this comes as a shock. The accepted wisdom was that static typing and early binding were good, resulting in more robust code and leaner, better-performing executables. Static typing means declaring the type of all the variables you use. Visual Basic has Option Explicit, which requires all variables to be declared, but still lets you get away without mentioning a type. The following runs fine:

```
Dim myvar
myvar = 1234
myvar = "a string"
Me.Caption = myvar
```

Behind the scenes, Visual Basic declares myvar as a Variant, which can represent any kind of type. Variants are slow. A quick test with a loop that tests whether numbers are prime is around three times faster when the variables are declared as integer. In Visual Basic 6, many developers learned to be disciplined, not only using Option Explicit but also remembering to use Dim with a type, even if it happens to be Variant. In VB.Net you can go further and enforce this with the Option Strict statement, making Visual Basic more like C or C#. Doing this enables the compiler to catch certain kinds of error, such as misspelt variables and illegal assignments, as well as helping the compiler to optimise performance. Programmers assumed strong typing was good.

So what changed? The answer is, several things. First, today's computers are faster, making performance less critical in many scenarios. Furthermore, there is more to performance than compiler efficiency. Most applications can be speeded up by making the algorithms smarter. If the language you use is more productive, you have more time to spend on optimisation, which is



a non-technical reason a slower, easier language might end up performing better than a faster, more difficult language.

The second change is an increasing awareness of the cost of static typing. For one thing, it means more typing. That might seem a trivial point, but it is not. More concise code is usually easier to understand as well as quicker to type. Dynamic typing also spares you the cost of trying to figure out in advance whether you need an Integer or a Long, a Single or a Double. If the compiler will just do the right thing, you can get more work done.

It is not just a matter of concise code. In some circumstances, static typing makes you jump through hoops. For example, imagine you have a couple of classes in your application, both of which need to support printing. Maybe one represents an address, and the other an order. Therefore you add Print methods to both classes. It might be convenient to have some code that can print both address and order objects, simply by calling Print as in this VB method:

```
Public Sub PrintIt(ByVal obj As Object)
obj.Print()
```

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## End Sub

(Key: ⌘ code string continues)

In a language such as C# or Java, you cannot do that directly. There are a host of workarounds. You can define an IPrintable interface and have both classes implement it. You can create a CPrintableObject class and have both the other classes inherit from it. You can use Reflection to look up the method at runtime. You can have some conditional code that checks the object type, casts to the appropriate object and calls its Print method, which is fine

until you create a third class with a Print method.

Whichever way you do it, you have to add a chunk of code. By contrast, this is easy in a dynamic language, where you simply call Print and let the runtime work out how to execute it. This is called 'duck typing' – if the object walks



**Top: Ruby on Rails, running locally after a successful install**

**Bottom: David Heinemeier Hansson, creator of Ruby on Rails said: 'Static typing is like a ball and a chain'**

like a duck and talks like a duck, it might as well be a duck. The trade-off is that you might get a runtime error if the method does not exist, or if it returns an unexpected type, whereas the stricter languages would catch this at compile time. The point is that static typing also has a cost, adding verbosity and complexity to the code.

Certain other things are harder to work around in non-dynamic languages. One is adding or removing methods at runtime. Another example, which will be familiar to many developers, is evaluation. This is where you take a string at runtime and execute it as code. Evaluation is very useful in certain applications, but it is absent from Java, C# and Visual

Basic. To get round this, you need to write your own parser, or compile code at runtime, or get some help from a different language. Microsoft's script control is one possible solution.

## Staying safe

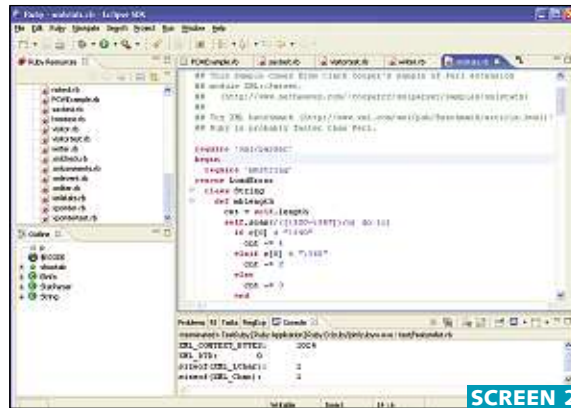
The classic criticism of dynamic coding is that it is not safe. The compiler will not catch as many errors, so problems will emerge at runtime. There could also be subtle bugs, such as when different classes have the same method name but with a different purpose in mind. Duck typing could fall flat on its face.

Dynamic language advocates respond by saying they have something better, which is test-driven development. This is a facet of the Extreme Programming movement, which argues that developers should write tests as they code, to verify that it runs correctly. 'Testing is as important as programming,' said Kent Beck in his book *Extreme Programming Explained*, adding more controversially that: 'beta testing is a symptom of weak testing practices and poor communication with customers'. Unit test frameworks such as JUnit for Java and NUnit for .Net make test-driven development feasible; testing is also built into Microsoft's new Team System edition of Visual Studio. Testing catches any kind of error, whereas static typing only catches type errors. A dynamic language accompanied by strong testing practice is likely to create more reliable applications than a non-dynamic language without testing.

Of course, you can do testing with any kind of language, not just a dynamic language. Arguably, that makes test-driven development with a non-dynamic language even safer. That may be true, but it is all a matter of context. Test-driven development is a big deal, a revolution in programming that delivers significantly more reliable code. In the context of a test-driven development project, any loss of safety from use of dynamic versus non-dynamic language is relatively minor.

## Which dynamic language?

The momentum behind dynamic languages is largely driven by Internet programming. Javascript is a dynamic language, complete with an eval function, and so are PHP, Python and Ruby. The creator of the popular Rails web framework (see screen 1), David Heinemeier Hansson (pictured opposite), told me in a recent interview



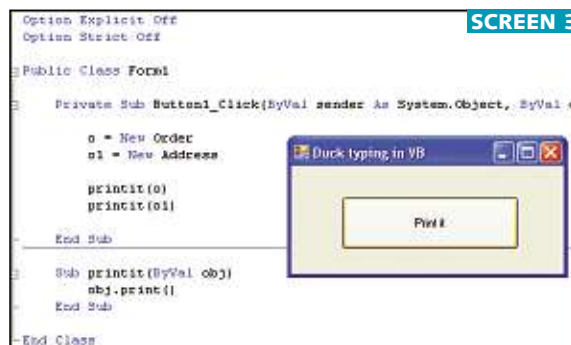
**Eclipse has a useful Ruby plug-in for work with the language**

that the dynamic typing in Ruby was a key factor in the success of Rails. 'The static typing of Java is a big part of what's holding it down,' he explained. 'In a world where testing is considered good, I think static typing is like a ball and chain.' Javascript is also on the rise, partly because of the trend toward Ajax applications, which make heavy use of client-side Javascript running in the browser, and partly because of initiatives such as Adobe Flex, formerly from Macromedia, which uses Javascript as the language for rich Internet-connected applications.

The Java and .Net camps are not quite ignoring this movement. Both Java and .Net meet the first requirement of dynamic languages, which is the need for a runtime engine. The next version of Java has its own dynamic scripting language, called Groovy, and there are also versions of Ruby and Python that run on the JVM (Java Virtual Machine).

Microsoft also has several dynamic language projects. One is the widely ignored JScript, which is part of the Framework and compiles to .Net intermediate language code. Another is Iron Python, currently in beta but nearing full release, which brings Python to the .Net Framework. Although Microsoft has these projects, it does seem unable to make much of them. All the marketing and examples from Microsoft focus on C# or Visual Basic. Given the general trend towards dynamic languages, that is surprising,

**This kind of relaxed coding used to be frowned upon, but it is in tune with the new trend towards dynamic languages**



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though as noted below VB actually has some dynamic credentials.

Ruby is a great language to try in order to get the flavour of dynamic programming. It is not hard to install. There is a Windows installer, along with a plug-in for Eclipse IDE; see screen 2 and the links at the end of this column. Watch this space for help with getting started.

## Go dynamic with Visual Basic

In the days of Visual Basic 6 and earlier, there were clear limitations to the language. Nobody doubted that C++ was more powerful, and while Visual Basic justified itself in terms of productivity, it always felt like the second citizen. In the .Net era, Visual Basic has close parity with C#, gaining features such as full inheritance and using the same Framework class library. Even so, C# is the shiny new language, most of Microsoft's Framework code is written in C#, and Visual Basic is the one that has to justify its existence.

Until no. It is already recognised that Visual Basic is easier to use than C# for things such as automating Microsoft Office, with features such as optional and named parameters to simplify the code. Visual Basic .Net is closer to a dynamic language than C#, especially if you do the unthinkable and turn off both Option Explicit and Option Strict. When Option Strict is off, Visual Basic supports duck typing (see screen 3).

In practice, working without strong typing in VB.Net is painful, because you lose intellisense code completion, the pop-up help that appears when you type the dot in the editor, but you can mix and match to some extent. You should also consider getting hold of NUnit, which is free, or Team System, and writing tests for your Visual Basic code. Perhaps the assumption that Visual Basic should be used with all the type safety of C# and C++ will prove to be unfounded. **PCW**

## Resources

**Extreme Programming Explained – Embrace Change**, by Kent Beck with Cynthia Andres.

2005 Addison-Wesley, ISBN 0-321-27865-8

**Ruby downloads**

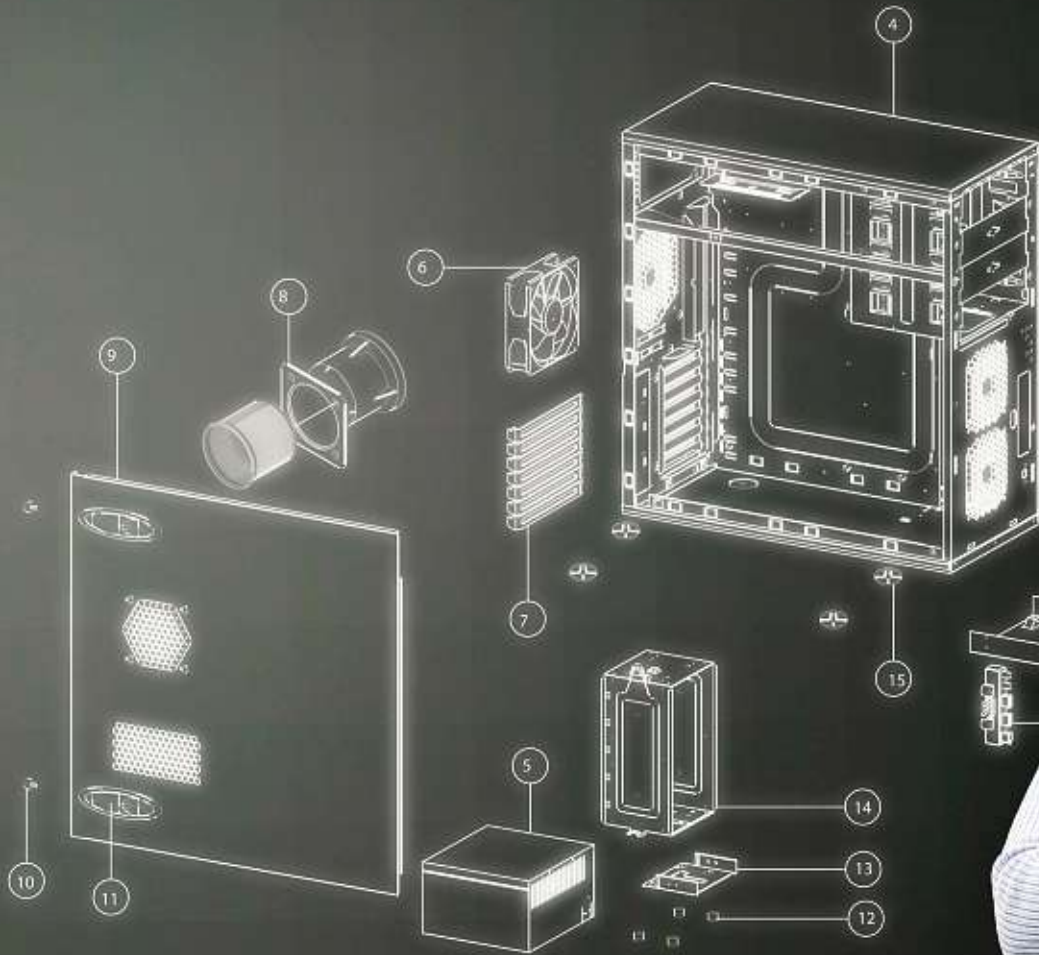
<http://rubyforge.org> for one-click

**Windows installer**

[www.rubypeople.org](http://www.rubypeople.org) for Eclipse

Ruby plug-in

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# How to buy the best products tested by our Labs

This Buyer's Guide is a comprehensive listing of the best products PCW has tested across a range of areas, helping you to make the best decision when you're planning a purchase. Over the following pages you'll find products, their verdicts and ratings, plus information on where you can read the full review.

## CONTENTS

<b>161</b> PCs	<b>165</b> Printers
<b>162</b> Graphics cards	TV tuners
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<b>163</b> Motherboards	Digital cameras
Digital music players	Routers
<b>164</b> Hard drives	<b>167</b> Product index
DVD drives	

Prices are for guide purposes only and may be subject to change



## HOW TO BUY: PCs




Many of the choices you are faced with when buying a PC are covered in the following pages. You need to think about the graphics card, memory, onboard sound or separate soundcard, size and type of hard disk, CD burner or DVD burner and so on.

Once your budget is set, the starting point is the CPU (central processing unit), because it is the brains of your PC.

Intel and AMD offer a bewildering number of processors. The differences between the CPUs are in technical details that don't necessarily mean much to end users. Pricing is also competitive, with AMD PCs generally cheaper than comparable Intel models.

Budget PCs come with Intel's Celeron or AMD's Sempron CPUs. These are aimed at undemanding users. If your needs are for word processing tasks and surfing the Internet with some low-end gaming or image editing, a PC running either of these processors is fine. You won't need a huge hard disk - 80GB will be plenty - coupled with between 256MB and 512MB of Ram and a low-end graphics card, or even onboard graphics for the truly undemanding. You'll be fine with onboard sound, and can expect to pay up to about £500, depending on your monitor.

In the mainstream desktop market it's Pentium 4 and Pentium D versus AMD's Athlon XP and Athlon 64. The chief

<b>1</b>		<b>Evesham Axis Dominator 79GT</b> £1,099 ★★★★★ Reviewed June 06 www.evesham.com	A good value for money PC running one of Nvidia's latest graphics cards.
<b>2</b>		<b>Sony Vaio XL-100</b> £999 ★★★★★ Reviewed June 06 www.sony.co.uk	A powerful Media Center PC with HDMI and component output, but a fairly bulky design.
<b>3</b>		<b>Apple Mac Mini</b> £599 ★★★★★ Reviewed June 06 www.apple.com/uk	Updated with the new Intel chipset, the dual-core Mac Mini is a good value alternative to a Windows PC.

difference is that older Pentium 4 and Athlon XP models are 32bit CPUs, while some newer Pentium 4s, the Pentium D and Athlon 64 are 64bit models. To take full advantage of this, you need a 64bit operating system and applications.

More memory can be supported by 64bit systems - 32bit Windows or Linux systems are limited to 4GB of Ram, whereas a 64bit Windows or Linux system can support 128GB. Data is also moved in larger chunks, allowing a theoretical speed advantage.

AMD and Intel offer high-end processors with the Pentium Extreme Edition and Athlon FX ranges, both aimed at the hardcore gaming market. They also have dual-core CPUs. These processors effectively act as two CPUs in one and offer superior performance.

If you're choosing a PC running the above CPUs, other considerations come

down to your needs. If you store lots of music, video or photos, go for a big hard disk - 200GB or above. Memory will help speed up applications, so aim for 1GB or above and don't drop below 512MB. The latest games demand the latest graphics cards, but for most people, cards that were new six to 12 months ago will be powerful enough. And look at the CPU's cache memory, which helps eliminate data bottlenecks.

Most PCs are Windows XP, and the Home Edition is fine. If it's for a small business or you need features such as remote access, buy XP Professional. Few PCs are sold running Linux, and we'd recommend only the technically confident buy a Linux-only system. Linux can always be installed later. Finally, don't overlook the monitor, especially if you're using the PC for gaming or imaging; buy the best you can afford.

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# BUYER'S GUIDE

78 PRODUCTS  
REVIEWED TO MAKE  
YOUR BUYING  
DECISION EASIER

## GRAPHICS CARDS

SUB £200		<b>EVGA GeForce 7800GS CO Superlocked</b> £160 ★★★★★ Reviewed May 06 www.evga.com	An excellent choice for AGP owners who demand fast graphics but don't want to spend a fortune.
		<b>Sapphire Radeon X800</b> £114.99 ★★★★★★ Reviewed February 06 www.sapphiretech.com	A decent PCI Express card based on ATI's X800 series with 256MB of Ram.
		<b>Sapphire Radeon X1300</b> £37.99 ★★★★★★ Reviewed February 06 www.sapphiretech.com	Great budget card with a core clock of 450MHz and 128MB of Ram.
£200-£349		<b>Gecube Radeon X850XT Uniwise</b> £269.97 ★★★★★★ Reviewed May 05 www.gecube.com	A single-slot design using Gecube's own cooling system, and it offers good performance.
		<b>Nvidia GeForce 7900GT</b> £280 ★★★★★★ Reviewed June 06 www.nvidia.com	A good value card that manages to beat ATI's similarly priced offering, but not by much.
		<b>Powercolor Radeon X850XT Platinum Edition</b> £320 ★★★★★★ Reviewed July 05 www.powercolor.com	Based on ATI's fastest Radeon processor, this card will run the latest games with ease.
£350+		<b>Gecube X850XT Platinum Edition Uniwise</b> £307 ★★★★★★ Reviewed January 06 www.gecube.com	High-end performance and quiet cooling for AGP motherboards.
		<b>ATI Radeon X1900 XTX</b> £363 ★★★★★★ Reviewed April 06 www.ati.com	Using the new R580 core, this is the fastest single-core graphics card currently available.
		<b>HIS Radeon X850XT Platinum Edition IceQII</b> £370 ★★★★★★ Reviewed June 05 www.hisdigital.com	Making use of the IceQII efficient cooling system, this is a quiet and super-fast card.
		<b>Nvidia GeForce 7800 GTX 512</b> £516 ★★★★★★ Reviewed February 06 www.nvidia.com	This card has an updated 7800 GTX chipset with a massive 512MB of Ram.

### HOW TO BUY

Most graphics cards are based on either the Nvidia GeForce or ATI Radeon family of chips. Each has their strengths and both offer state-of-the-art image acceleration and comparable features.

Performance improves as you move up a range. Top chips offer more features and draw more pixels or textures in a single pass than cut-down, lower-cost options. All current graphics processors are fine for office work, but hardcore gamers favour Nvidia's GeForce 6800 or new 7800 series and ATI's latest X1900 XTX card.

Ensure the card you buy can display favoured resolutions with at least a 75Hz monitor refresh rate to avoid eye strain from flicker (if using a CRT monitor).

There are usually three clock speeds quoted (in megahertz). Core clock is the internal speed of the graphics processor. Memory speed (or memory clock) is the speed of data transfer between the graphics card's onboard memory and the graphics processor. Ramdac speed is the capability of the digital-to-analogue converter that provides the graphics output from the card.

Graphics cards use their own dedicated video memory to store data, images and textures. The more you have, the better the performance. A card with 64MB is fine for office tasks, but we

recommend at least 128MB or 256MB for the latest games and video applications.

Around £40 will buy you a GeForce FX 5200 or Radeon 9200 card with 128MB of Ram, which is good for 2D action/strategy games, image editing and less demanding 3D games.

To play 3D action games smoothly, look at £100-£150 cards. Serious gamers should consider the GeForce FX 6800 GT at £280-plus, Radeon 850 XT at £320-plus, or 7800 GTX at £350-plus.

Depending on the motherboard, you'll need an AGP or PCI Express graphics card. PCI Express is the newest interface standard, offering up to double the bandwidth of an AGP 8x slot for even faster and more complex graphics. Both ATI and Nvidia offer PCI Express versions of most of their cards. Nvidia also has its SLI (Scalable Link Interface) technology that lets you use two PCI Express graphics cards in SLI-enabled motherboards for ultimate performance. ATI's rival technology Crossfire is due soon.

Look for support for both analogue (VGA) and digital (DVI) displays, and S-video and composite video outputs for use with TVs. Some 'all-in-one' cards have a built-in TV tuner and video-capture options, so you can save money rather than buying separate cards.

## NOTEBOOKS

1		<b>Acer Travelmate 8204WLMi</b> £1,761.33 ★★★★★★ Reviewed April 06 www.acer.co.uk	Powered by Intel's new Core Duo processor, this notebook beats most desktop PCs on performance.
2		<b>Sony Vaio TX2-HP</b> £1,498.99 ★★★★★★ Reviewed June 06 www.sony.co.uk	If you're not a demanding user, this is a stylish notebook that's as ultraportable as they get.
3		<b>Samsung Q30</b> £1,499 ★★★★★★ Reviewed June 06 www.samsung.co.uk	An ultraportable notebook that has style, but not for those after performance.
4		<b>Evesham Voyager C720</b> £1,499 ★★★★★★ Reviewed February 2006 www.evesham.com	Great gaming notebook with a 17in display and Geforce Go 7800 graphics.
5		<b>Rock Xtreme 64</b> £2,231.33 ★★★★★★ Reviewed May 06 www.rockdirect.com	A quality notebook with plenty of features and the processing power to match a desktop.

### HOW TO BUY

Notebooks have caught on like wildfire with consumers thanks to plummeting prices and massive marketing campaigns. However, there are so many options that it's easy to get confused.

Decide what you want your notebook for. If it's for occasional use, running some office applications, accessing the Internet and email, then almost any low-cost notebook will do the job. If it's for gaming or running video-editing software, you will be looking for a notebook with a large 15in/17in screen - possibly widescreen - a high-end Nvidia or ATI graphics chip, 1GB of memory and an 80GB (or bigger) hard disk.

In the low-cost arena, Intel has its Mobile Celeron chip and AMD has Sempron. In the midrange/high-end space, there are Intel's Mobile Pentium 4 or Pentium 4 chips, while AMD offers Mobile Athlon 64 and Athlon 64. Expect to find these in desktop replacement systems and those used by gamers.

For the best in performance with power-saving technology, go for Intel's Pentium M or AMD's Turion 64 processors.

Any notebook you get should have in-built Bluetooth and Wifi connectivity, a 30-40GB hard disk drive, 512MB of Ram, 14-15in screen, USB2 or Firewire ports, DVD/CD-RW combo drive and three to four hours' battery life.

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## MOTHERBOARDS

1		<b>ECS PF88</b> £64.63 ★★★★★ Reviewed August 05 www.ecs.com.tw	The PF88 is feature-packed and compatible with both Intel and AMD processors.
2		<b>Aopen i915GMm-HFS</b> £79 ★★★★★ Reviewed July 05 www.aopen.com	The HFS makes the ideal platform for building a quiet, power-efficient Intel PC.
3		<b>Asus A8N-SLI Deluxe</b> £98 ★★★★★ Reviewed April 05 www.asus.com	A good, all-round AMD SLI board that is packed with plenty of features.
4		<b>ECS 915-A</b> £61.81 ★★★★★ Reviewed June 05 www.ecs.com.tw	All the features you'd expect from a modern Intel-based motherboard and outstanding value for money.
5		<b>Asus K8N-E Deluxe</b> £59 ★★★★★ Reviewed November 04 www.asus.com	A tidy AMD board with lots of room around the major components and a wide range of features.
6		<b>EpoX 8HDA3+</b> £79.92 ★★★★★ Reviewed July 04 www.epox.com	An AMD board that stands out from the crowd thanks to its dual Lan and external Sata support.
7		<b>MSI 945P Platinum</b> £99 ★★★★★ Reviewed November 05 www.msi.com.tw	An Intel board that features DTS Connect, so you can output true DTS surround-sound audio.
1		<b>Gigabyte GA-8N-SLI Royal</b> £149 ★★★★★ Reviewed October 05 www.giga-byte.com	Featuring an Nforce4 chipset, this model from Gigabyte supports all Intel 775 processors.
2		<b>Abit Fatal1ty AN8</b> £119.80 ★★★★★ Reviewed August 05 www.abit.com.tw	This AMD board has enough flexibility and Bios features to keep overclockers happy.
3		<b>ECS PF22 Extreme</b> £123 ★★★★★ Reviewed February 06 www.ecs.com.tw	A good range of features including dual graphics support courtesy of ATI's Crossfire technology.

## HOW TO BUY

The motherboard dictates the type of processor you can use, how well the other components

communicate, the features on offer and future upgrade potential.

Cheap boards limit processor support, graphics and expansion options. Around £70-£100 gets you the latest technologies.

Most desktop and tower cases use a standard ATX-size motherboard but, if you're building a small system, look at compact MiniATX or MicroATX designs. If using an existing case, make sure you buy the right form factor.

Your choice is also dictated by the processor. You'll need Socket 775 for current Intel processors, Socket A for AMD Athlon XP or Duron, and Socket 939 for an Athlon 64. The Athlon 64 FX series requires Socket 940. If using an older CPU, check the socket type.

We would recommend an Intel P4 or Athlon 64 for a good all-round system. The Athlon 64 can address one terabyte of Ram (1,000GB) and handle difficult calculations with relative ease.

The new generation of processors also change the way data is transferred. Whereas P4s rely on the motherboard chipset to shuttle data between processor and memory, Athlon 64s avoid this by integrating the memory controller into the CPU die.

Divided into northbridge and southbridge, the chipset handles the communication between all the components and dictates the features on offer. Today's leading chipset manufacturers include Via, Silicon Integrated Systems (Sis), ATI, Nvidia and Intel. Chipsets can include integrated graphics.

Today's motherboards mainly use DDR or DDR2 Ram, available in 200, 266, 333 and 400, 667 and 800MHz modules.

Also consider the number of slots available. Fit dual in-line memory modules (Dimms) in pairs if the chipset supports dual-channel operation.

The latest boards support both older IDE and new, faster Serial ATA (Sata) hard disks. Check the number of connectors available for both.

Some chipsets provide Raid support, so data can be spread across two drives for extra performance or backups. SCSI controllers can be found on more expensive boards, or be added with expansion cards.

Also important is the number of USB2 and Firewire sockets for external add-ons. You may need serial, parallel and PS/2 interfaces if using older legacy peripherals. Look out, too, for onboard Ethernet networking, a built-in 56K modem and onboard sound. The latter is fine for all but audio buffs or avid gamers.

## DIGITAL MUSIC PLAYERS

1		<b>Apple iPod</b> £219 ★★★★★ Reviewed January 06 www.apple.com/uk	All the usual iPod features but now with the ability to play video.
2		<b>Creative Zen Nano Plus</b> £99 ★★★★★ Reviewed December 05 http://europe.creative.com	1GB flash player that houses a radio, voice recorder and mp3 encoding from a line-in source.
3		<b>Philips HDD6320</b> £229 ★★★★★ Reviewed March 06 www.philips.co.uk	Sleek and stylish, this 30GB player from Philips is incredibly easy to use.
4		<b>Apple iPod Shuffle</b> £89 (1GB); £69 (512MB) ★★★★★ Reviewed May 05 www.apple.com/uk/ipod	Small yet perfectly formed, it's easy to use, has good sound and is set to be a big hit.
5		<b>Iriver H340 SE</b> £339 ★★★★★ Reviewed January 05 www.epinx.com	A good all-round player with a colour screen and built-in FM tuner.

## HOW TO BUY

The mp3 music format recently celebrated its tenth birthday and in that short space of time it has revolutionised the music industry. On the way, it has spawned a global market for digital music players, none more famous than Apple's iPod and related offerings.

There are two main categories that players can be divided into: Flash memory-based players, which range in size from 256MB to 1GB and mini hard drive-based models, which run from 4GB to 60GB. Prices for a 256MB player start as low as £20 rising to around £300 for a 60GB player. In terms of songs, the difference is the ability to hold 40 on one and 15,000 on the other. If you just

want something for using on-the-move, then Flash-based players are the way to go, since they are very small and light.

The software used in many players determines how easy it is to use in terms of tracklisting and organising songs.

If you need a portable record store, then start by looking at the wide range of 4GB-6GB players and, if that's not enough, head for the 20GB, 40GB and 60GB models. Ensure whatever you buy supports playback in different formats. The ability to listen to FM radio and record voice is also a bonus. Most importantly, check out the battery life, since this can vary wildly between similar devices.

## HARD DRIVES

INTERNAL		<b>Western Digital Raptor X</b> £243.17 ★★★★★ Reviewed June 06 www.wdc.com	Two 75GB platters combine to create one of the fastest non-SCSI hard drives.
		<b>Seagate Barracuda 7200.8 (ST3400832A) 400GB</b> £186.96 ★★★★★ Reviewed July 05 www.seagate.com	This massive 400GB drive offers impressive capacity and an 8ms seek time.
		<b>Hitachi Deskstar 7K250 (250GB SATA150)</b> £88 ★★★★★ Reviewed May 04 www.hitachi.co.uk	Those needing a large SATA150 drive will find this a great bargain.
		<b>Samsung Spinpoint P120S</b> £80.11 ★★★★★ Reviewed February 06 www.samsung.co.uk	This isn't the fastest drive on the market, but it is extremely cool and quiet.
		<b>Hitachi Travelstar 7K100</b> £175 ★★★★★ Reviewed June 06 www.hitachi.co.uk	A speedy 100GB 2.5in model to replace your ageing notebook hard drive.
EXTERNAL		<b>Maxtor Onetouch II Firewire 800 300GB</b> £179 ★★★★★ Reviewed November 05 www.maxtor.com	A good-quality 300GB USB and Firewire hard drive that comes with backup software.
		<b>Western Digital My Book Essential Edition</b> £149 ★★★★★ Reviewed June 06 www.wdc.com	This is a stylish external hard disk drive, but it lacks a network option.
		<b>Lacie Safe Mobile Hard Drive 80GB</b> £149 ★★★★★ Reviewed December 05 www.lacie.co.uk	Featuring a fingerprint reader for security, this 80GB external hard drive would suit business users.
		<b>Buffalo Linkstation 120GB</b> £240 ★★★★★ Reviewed October 04 www.buffalotech.com	If you want easy-to-use external network storage, this is a great choice.
		<b>Buffalo Ministation HD-PHS40U2/UC</b> £70 ★★★★★ Reviewed April 06 www.buffalo-technology.com	This 40GB portable hard drive includes shock protection to minimise the risk of data loss.

### HOW TO BUY

If you're building a high-performance system, buy the fastest drive you can afford; if you just want lots of capacity then slower drives offer better value.

OEM or 'brown box' drives are cheaper - this is the bare drive without the extras, such as cables, included in retail boxed versions.

The transfer rates in today's Ultra ATA drives are 100Mbytes/sec (133Mbytes/sec for Maxtor drives), while Serial ATA (Sata) drives are rated at 150Mbytes/sec. Check the seek times, spindle speed, buffer size and the areal density of the platters (disks).

Usually in milliseconds, seek time is how long a drive's heads take to find data on the disk. The speed at which the spindle holding the disks spins ranges from 4,200rpm for a notebook drive to 15,000rpm for some SCSI drives. Generally, faster speeds give better performance.

The larger the buffer (cache), the more recently written or stored data is held in the drive's memory, resulting in less time seeking the data on the disk.

Areal density is the amount of data stored on a given area of a drive's platter. The more data per square centimetre (gigabytes per platter), the less disk movement is required to bring it under the heads.

Originally Integrated Drive Electronics (IDE), then Enhanced IDE (E-IDE), this common parallel interface is usually written as ATA (AT Attachment), modified with speed improvements in recent years to Ultra ATA/xxx, where xxx is the peak bandwidth in Mbytes/sec. To differentiate Ultra ATA from Sata, the term Parallel ATA is used.

Faster Sata drives are more expensive than Parallel ATA. Sata uses two pairs of high-frequency cables, working at low voltage.

SCSI (Small Computer System Interface) drives are technically no different to ATA drives, but support up to 16 devices on a single channel and you can have multiple channels in a PC. The disadvantage, though, is price.

Most motherboards support Raid (Redundant Array of Independent Disks), which connects multiple drives, to improve performance or provide fault tolerance.

One problem you may hit is the inability to access the new drive's full capacity. Some older Bioses only support drives up to 137GB. This may be solved by updating the PC's Bios. Retail boxed disks often come with software to fool the Bios into recognising the disk, or you can buy a separate disk controller card, which fits into a PCI slot.

## DVD DRIVES

1		<b>NEC ND-4551A</b> £35 ★★★★★ Reviewed May 06 www.nec.co.uk	An excellent DVD drive supporting every format and Labelflash technology.
2		<b>Pioneer DVR-110 Supermulti</b> £40 ★★★★★ Reviewed March 06 www.pioneer.co.uk	Supports all major formats, including DVD-Ram. Good value for money.
3		<b>Toshiba SD-R6472</b> £83.42 ★★★★★ Reviewed September 05 www.span.com	A slimline dual-layer DVD writer that performs well and is perfect for small form factor PCs.
4		<b>Philips DVDR16LSK</b> £59.99 ★★★★★ Reviewed October 05 www.philips.co.uk	An excellent Lightscribe-capable dual-layer DVD burner that's very keenly priced.
5		<b>LG 12X Super Multi DVD</b> £116.99 ★★★★★ Reviewed January 05 www.lge.co.uk	Good-value external USB2/Firewire rewriter with all-format media support.

### HOW TO BUY

DVD drives have largely replaced CD-Rom, CD-R and CD-RW drives in all but a few entry-level PCs and notebooks. Many systems still offer DVD-Rom drives as secondary drives - used for playback of discs only - while a growing number have a DVD writer or rewriter for burning your own DVDs as the main system drive.

DVD burners can be divided into internal and external drives. Internal drives are cheaper than their external counterparts, but require a level of knowledge so you can install them yourself. You can opt for one of the external offerings which can be hooked up simply via USB2 or Firewire.

Most drives are multi-format, meaning they can write to all key media types, so make sure yours supports DVD+R, DVD+RW, DVD-R and DVD-RW discs. Newer double and dual-layer drives can write to new discs which can store 8.5GB versus the 4.7GB capacity of existing discs. This is useful for backing up your DVD movie collection or chunks of your hard drive on a single disc.

The dual-layer drives cost little more than single-layer drives, so are a good investment. The same cannot be said for the cost of dual-layer discs. A branded, dual-layer 8.5GB disc will cost around £3.75. Rewritable dual-layer discs will not arrive until the end of 2006.

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## PRINTERS

PHOTO PRINTERS		<b>Epson Picturemate 100</b> £100 ★★★★★ Reviewed January 06 www.epson.co.uk	This is a high-quality photo printer that is both cheap and easy to use.
		<b>Canon Pixma IP5000</b> £129 ★★★★★ Reviewed June 05 www.canon.co.uk	If it's pixel-perfect printing you're after, look no further than the IP5000 - a real bargain.
		<b>HP Photosmart 8450</b> £170 ★★★★★ Reviewed April 05 www.hp.com/uk	HP's Photosmart 8450 is a bulky printer, but it's capable of producing stunning photo prints.
		<b>Epson Stylus Photo R340</b> £149 ★★★★★ Reviewed February 06 www.epson.co.uk	Excellent-quality prints and the ability to function without a PC.
MULTIFUNCTION DEVICES		<b>Canon Pixma MP150</b> £69 ★★★★★ Reviewed December 05 www.canon.co.uk	Photo quality might not be the best, but as a budget MFP the MP150 is a great buy.
		<b>Dell Photo All In One 944</b> £121 ★★★★★ Reviewed April 06 www.dell.co.uk	A bulky, but good quality MFD that would suit both home and small office use.
LASER PRINTERS		<b>Dell 1600n</b> £236 ★★★★★ Reviewed September 05 www.dell.co.uk	A good multifunction mono laser, perfectly suited to small or home offices.
		<b>Canon LBP-5200</b> £224 ★★★★★ Reviewed October 05 www.canon.co.uk	A great-value colour laser printer that's both small and capable of delivering quality prints.
		<b>Dell Laser Printer 1100</b> £93 ★★★★★ Reviewed November 05 www.dell.co.uk	A cheap mono laser printer, but it comes with a relatively small starter toner cartridge.
		<b>HP Laserjet 1020</b> £89 ★★★★★ Reviewed August 05 www.hp.com/uk	A great home laser printer that's fast, good quality and is one of the cheapest lasers available.

### HOW TO BUY

If you don't need colour, consider a monochrome laser or LED printer. The latter tend to be cheaper and may last longer than a laser, but LED printers have a fixed resolution and can't take advantage of software-based resolution enhancements.

If you print hundreds of pages a week, a laser is the best option as they're cheaper and more reliable for high-volume printing. If you print a few pages a month, buy a cheap colour inkjet. If printing high-quality colour photos, buy a good photo printer.

Look for the manufacturer's quoted 'duty cycle' - this is how many pages a month the machine can handle. Choose a duty cycle three or four times larger than your expected average usage. Also check the printer's 'engine life' or 'total print volume' - after this expires, the printer's on borrowed time and uneconomical to repair.

Quoted printer speeds often refer to the speed the printer pushes a blank sheet of paper through the mechanism; for documents they tend to refer to lower quality settings. PCW's tests use real documents and photos, giving a better idea of print speed.

For serious inkjet photo printing, consider higher-end models that use six, seven or eight colour cartridges. Normal

inkjets use three colours (cyan, yellow and magenta) plus black, while specialised photo printers add extra shades to improve colour fidelity. Cheaper models often combine three colours in a single cartridge, which is not as economical as using separate cartridges for each colour.

Some 'convertible printers' use four separate black cartridges for longer-life mono printing and you can replace three of them with cyan, magenta and yellow cartridges for colour printing.

Laser models for business use often have a large number of paper-handling options. They're usually modular so you can add features as required. They also have a wider range of interface options and consumables.

You'll often find bundled software with a printer. Their quality varies, but there can be some useful programs.

The quality and usability of the driver software is vital, but it's difficult to assess before buying. Check PCW's reviews and online forums ([www.pcw.co.uk/forums](http://www.pcw.co.uk/forums)) and read the manufacturer's technical support site for any known problems.

Third-party or refurbished consumables generally work fine, but can cause problems with quality and reliability. Your warranty may not cover the use of non-approved consumables.

## TV TUNERS

1		<b>Terratec CinergyT USB XS</b> £60.22 ★★★★★ Reviewed June 06 <a href="http://en.terratec.net">http://en.terratec.net</a>	A dual-format USB TV tuner complete with remote control and portable aerial.
2		<b>Nebula Digitv</b> £99.95 ★★★★★ Reviewed August 05 www.nebula-electronics.com	This external USB2 tuner has a built-in web server to let you share TV over your network.
3		<b>Twinhan Magic Box</b> £69.99 ★★★★★ Reviewed August 05 www.twinhan.com	A stylish external USB2 tuner with good software and an attractive price.
4		<b>Terratec Cinergy 400 TV</b> £89.99 ★★★★★ Reviewed March 05 <a href="http://en.terratec.net">http://en.terratec.net</a>	A PC Card-based analogue tuner with good software, it's a great buy for laptop users.
5		<b>Visionplus VisionDTV</b> £69.99 ★★★★★ Reviewed November 04 www.twinhan.com	A bargain price and top-notch features make this a must-buy USB2 digital TV tuner.

### HOW TO BUY

Internal TV tuners require a PCI slot. External options connect via USB and are easier to set up. Hi-speed USB2 is often needed and devices typically require Windows ME, 2000 or XP. Check if you run Windows 98 or NT.

A Freeview digital tuner offers the best channel choice, picture and sound, but may need an outdoor aerial or a wideband aerial (you can check at [www.freeview.co.uk](http://www.freeview.co.uk)). Analogue terrestrial TV tuners may give better results if using an indoor receiver. If a digital tuner receives digital audio broadcasting (DAB) support. Look for Teletext and subtitle support.




Digital tuners record to disk for maximum quality; analogue signals need to be digitally encoded - look for mpeg-2 hardware for realtime video and audio encoding; cheaper tuners need your CPU to do this in software.

Most analogue systems let you capture video from a VCR or camcorder. Look for composite or S-video connectors and stereo phono inputs. Typically, an hour of mpeg-2 video uses up to 2GB of disk space. VHS-quality mpeg-1 gives just over an hour on a CD.

Better TV cards have personal video recorder functionality, letting you pause, fast forward and rewind live TV, and have an electronic programme guide to record shows to your PC.



## MONITORS




20IN		<b>Sony MFM-HT205</b>	<b>£649</b> ★★★★★ Reviewed June 06 www.sony.co.uk	An elegant widescreen multimedia monitor with superb image quality and a built-in TV tuner.
		<b>Eizo Flexscan S2110W</b>	<b>£712.05</b> ★★★★★ Reviewed May 06 www.eizo.co.uk	Excellent performance and a formidable specification, but very expensive.
19IN		<b>Acer AL1922HS</b>	<b>£279</b> ★★★★★ Reviewed September 05 www.acer.co.uk	The AL1922HS offers a great balance of features, performance and price.
		<b>CTX S966A</b>	<b>£219</b> ★★★★★ Reviewed September 05 www.ctxeurope.com	Excellent value for money and looks a lot more expensive than it really is.
17IN+		<b>LG Flatron L1732P</b>	<b>£239</b> ★★★★★ Reviewed February 06 www.lge.co.uk	Fast response times make this 17in panel a good choice for gamers.

### HOW TO BUY

Monitor resolution is the number of picture elements (pixels) displayed on a screen. In any TFT or LCD monitor, each pixel is composed of three sub-pixels coloured red, green and blue. The number of pixels equals the 'native' resolution; a 1,024 x 768 TFT will have exactly that number of pixels horizontally and vertically. Users wanting 1,600 x 1,200 will probably need an expensive 20in model - most 19in panels are currently limited to 1,280 x 1,024. Modern TFTs can be viewed from a wide range of angles vertically and horizontally, but anything over +/- 45° makes no

difference in normal use. Response time is the time taken for a pixel to reach maximum brightness. Some newer monitors now have response times as low as 4ms, but 12-25ms is typical. The ISO 13406-2 standard specifies minimum requirements for display contrast, viewing angle, brightness, reflections, flicker, contrast and defective pixels. ISO 13406-2 has stringent standards for defective pixels. Only Class I TFTs are guaranteed no defective pixels - most consumer models are Class II. Some manufacturers offer dead pixel guarantees with Class II TFTs - check the policy before you buy.

## DIGITAL CAMERAS

DIGITAL SLR		<b>Canon EOS 350D</b>	<b>£799</b> ★★★★★ Reviewed December 05 www.canon.co.uk	This is a hugely capable digital SLR camera that won't disappoint.
		<b>Konica Minolta Dynax 5D</b>	<b>£649.99</b> ★★★★★ Reviewed December 05 www.konicaminolta.co.uk	A very usable camera, although it's a little weighty. Anti-shake mechanism is excellent.
PROSUMER		<b>Fujifilm Finepix S9500 Zoom</b>	<b>£469.99</b> ★★★★★ Reviewed February 06 www.fujifilm.co.uk	A serious contender to entry-level digital SLRs with a 10x zoom and 9megapixel CCD.
		<b>Olympus E-500</b>	<b>£600</b> ★★★★★ Reviewed April 06 www.olympus.co.uk	The long awaited successor to the popular E-300 doesn't fail to impress.
COMPACT		<b>Canon Powershot A520</b>	<b>£239</b> ★★★★★ Reviewed July 05 www.canon.co.uk	Perfect for those who want a versatile and easy-to-use digicam without spending a fortune.

### HOW TO BUY

In general, the higher the megapixel count of a digital camera's sensor - and the bigger the sensor's physical size - the more detailed the images. A small sensor and high megapixel count won't always produce better image quality. Four to 5 megapixels is good for 8 x 10in or larger prints. The quoted 'effective' pixels number is the camera's true megapixel resolution. Forget digital zoom and concentrate on the optical zoom, which zooms in on the subject and produces a better-quality image. Digital zooms simply crop

into the centre of the picture. Look at the selection of automatic or preset picture modes for standard shots, portraits, night shots and landscapes, plus macro modes for close-up photography. Movie modes aren't as good as even a basic camcorder, but are fine for short movie clips to play on your PC. Most offer 15fps, but some are 30fps, which means the video will be smoother. Experienced photographers will want manual controls for aperture and shutter priority, white balance and focusing. Good cameras should also provide quick and easy access to image quality, resolution and format settings.

## ROUTERS

WIRELESS/MODEM		<b>Netgear 108 ADSL router</b>	<b>£159</b> ★★★★★ Reviewed April 05 www.netgear.co.uk	If you need a Super-G router with built-in ADSL modem, this offering from Netgear is great value.
		<b>Ozenda 11g ADSL Router</b>	<b>£70</b> ★★★★★ Reviewed November 04 www.ozenda.com	Ozenda has come up trumps - wireless ADSL doesn't get any easier than this.
WIRELESS		<b>Linksys WAG54G (wireless)</b>	<b>£76</b> ★★★★★ Reviewed August 05 www.linksys.com	This 802.11g wireless model offers advanced features for home and professional users.
		<b>D-Link DSL-G624M</b>	<b>£110</b> ★★★★★ Reviewed March 06 www.d-link.co.uk	Combines Mimo technology with Super G to give faster speeds and extended coverage.
VOIP		<b>Intertex IX66+ ADSL Airsip GW (wireless VoIP)</b>	<b>£269.08</b> ★★★★★ Reviewed March 05 www.intertex.se	For a small business needing multi-user VoIP telephony, the Intertex IX66+ is hard to beat.

### HOW TO BUY

The router is at the heart of any home network. Costing less than £100, they are an inexpensive way to exploit the advantages of being able to share information between the computing devices in your home. A router is a simple networking device to which you connect your PCs and notebooks using a network cable. They often include built-in firewalls and other security measures, making them ideal for protecting your PCs from intruders. The router connects to your broadband modem, as long as your modem uses an RJ45 Ethernet connection - most

routers don't support USB modems. Special broadband routers, also called ADSL gateways, come with built-in ADSL modems. If your broadband is provided via a cable company's set-top box, you should buy a standard router without a built-in modem. Once hooked up, your devices can share broadband as well as swap data. Wireless (Wifi) routers are increasingly popular in the home market, allowing devices to remotely connect to the Internet and each other without the need for cables - but wireless routers usually have network (Ethernet) ports to let you connect non-wireless devices.

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# PRODUCT INDEX

Below is a list of every product reviewed by PCW over the past three months, to help you find the full reviews quickly and easily in your back issues.

Key: ★ Editor's Choice ★ Recommended ★ Great Value All scores are out of five

COMPANY	PRODUCT	ISSUE	SCORE	COMPANY	PRODUCT	ISSUE	SCORE	COMPANY	PRODUCT	ISSUE	SCORE	
	01 Communique	I'm In Touch 5.10	April 06	4	Elonex	Prowire 153 (notebook)	May 06	4	★ Olympus	E-500 (digital SLR)	April 06	4
★ 3am Labs	Log Me In Pro 2.30.523	April 06	5	Enlight	EN-7473 Home Media Case	May 06	4	★ Ontrack	Easy Recovery Lite	March 06	4	
3Com	Office Connect VPN Firewall	March 06	2	Epson	Aculaser C1100N (laser printer)	May 06	4	Orlogix	Replace MyPC Suite	March 06	3	
★ Acer	Aspire 9503EWSMi (notebook)	May 06	4	Evesham	Axis FX 60 (desktop PC)	March 06	4	Panasonic	SDR-S100 (digital camcorder)	March 06	3	
★ Acer	Travelmate 8204WLMi	April 06	5	Evesham	Axis SB (desktop computer)	April 06	4	★ Panrix	IQ Cube 3800X2 (SFF PC)	March 06	5	
Acer	Travelmate C202Tmi (tablet PC)	April 06	3	Evesham	Blue Media BM6380GPs (sat nav)	May 06	2	★ Panrix	Magnum IQ 3700 (desktop)	April 06	5	
Acoustic Energy	Wifi Radio	May 06	4	Evesham	E-kube (SFF PC)	March 06	3	★ Pantone	Huey (image editing software)	April 06	4	
★ Actinic	Express (e-commerce software)	April 06	4	Evesham	Mini PC Plus (SFF PC)	March 06	3	PC Nextday	Zoostorm 9-6201 (SFF PC)	March 06	3	
Active@ Undelete	Active Data Recovery	March 06	4	Evesham	Nav-Cam 7000 (sat nav)	May 06	2	★ PC Nextday	Zoostorm 9-5401 (desktop)	April 06	4	
★ Activision	The Movies	April 06	4	Evesham	Voyager A215 (notebook)	May 06	3	PC Tools	File Recover 5 (data recovery)	March 06	3	
Agatha Christie	And Then There Were None	May 06	3	★ EVGA	7800GS CO Superclocked	May 06	5	Philips	170X6 (monitor)	March 06	3	
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AJP	M551G-E (notebook)	May 06	3	★ Fujitsu Siemens	Amilo M 6450G (notebook)	May 06	4	★ Philips	HDD6320	March 06	4	
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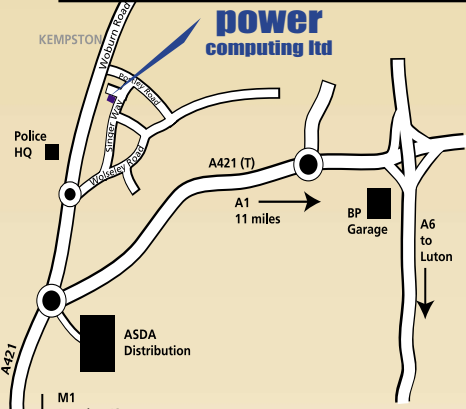
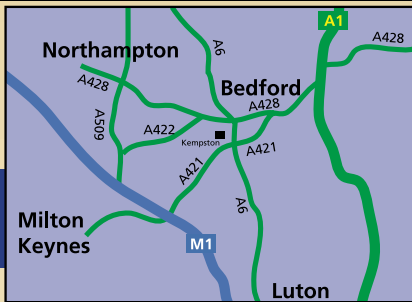
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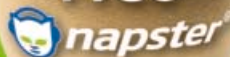
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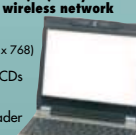


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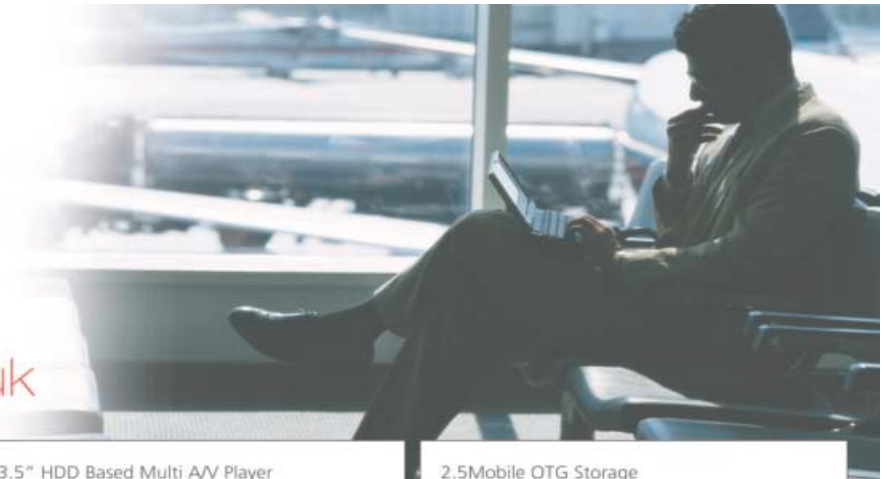
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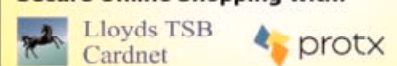
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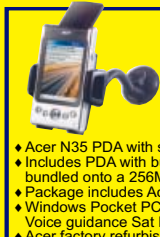
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• MS Windows XP Home and Microsoft Works software  
• HP factory clearance refurb stock with 1 year warranty  
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##### Samsung Panel

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- Wall mountable (kit at extra cost)

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- 10,000:1 contrast gives a superb picture compared with 1000:1 contrast of lower quality plasma or LCD panels that give a washed out picture
- 1500 cd/m2 (candelas per m2) means a very bright picture ideal for DVD and Video

##### HD TV Ready

- HDMI compatible digital video and digital audio input and HDCP (High Definition Content Protocol)
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# COVER DISC

### SOFTWARE LISTING

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Expert PDF Standard 3  
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Ghostsurf 2006 Platinum  
Powerconverter XP v. 5.0  
System Mechanic 6  
Turbodemo 7

##### FROM THE MAGAZINE

HD Tach 3  
Kerio Mailserver 6  
PCW Product Index

##### FREWARE INCLUDING

3D Traceroute 2.1.8.18  
AI Roboform 6.6.7  
Autoplay Repair 2.0.2  
Chat Controller 1.1.0  
Get Control 1.1.0.21  
Mac Spoofer 2006 2.0

##### RESOURCES INCLUDING

Dozens of useful programs and utilities – see disc for more information.

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Serif Mediaplus 1

##### TRIAL VERSIONS

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##### FROM THE MAGAZINE

Fruity Loops Studio 6  
Storm Music Studio 3  
Ulead Photoimpact 11

##### LINUX & OPEN SOURCE

Fedora Core 5  
Gentoo Linux 2006.0

##### SLAX 5.0.8

Ubuntu Dapper Drake  
6.04 Flight 5

##### RESOURCES

Open Office 2.02  
Paint .Net 2.6, Studioline  
Photo Basic 3.4  
Ultimate Boot CD 3.4

##### GAME DEMOS

Astronoid; Black & White 2; Championship Manager 2006; Ice Age 2 The Meltdown; Sniper Elite; Take Command 2nd Manassas

### USING THE COVER DISC

The PCW cover disc uses a web-browser-style interface. To get full functionality, you'll need to use Microsoft Internet Explorer (version 5.5 or later). Unfortunately, Netscape doesn't properly support this software. However, we have also provided links to the featured programs so you can still copy them to your hard disk or install them manually (the standard download dialogue box will appear). Programs can be found in the \software\ folder on the disc.

#### STARTING THE DISC

The CD-Rom (or DVD) should auto-start. If it doesn't, double-click the CD-Rom/DVD icon in My Computer or open the terms.htm file on the root of the disc.

#### PROBLEMS?

Please note that we cannot give support on individual programs contained on this disc. If you have problems running the disc or any of its content, please note these guidelines:

#### FAULTY DISC

If the disc is physically damaged and will not load, return it to this address for a replacement: PCW June 2006, cover disc ABT, 306 St Mary's Lane, Upminster, Essex RM14 3HL quoting reference: 'PCW Vol 29 No 6'.

#### PROBLEMS INSTALLING/RUNNING THE SOFTWARE

Check the support page on the disc or check the manufacturer's site.

#### GENERAL DIFFICULTIES

Call 08700 885 995 (9.30am to 5pm Mon, Tues, Thurs & Fri; open until 8pm on Wed and 10am to 2pm Sat). Or go to [www.vnusupport.co.uk](http://www.vnusupport.co.uk) or email us at [pcw@vnusupport.co.uk](mailto:pcw@vnusupport.co.uk).

For software requiring registration, PCW cannot guarantee that serial codes will be available later than three months from the on-sale date of the magazine. Please avoid disappointment by registering your software promptly.

### SIX PAGES OF DISC INFO INCLUDING

- PRODUCT DESCRIPTIONS
- WORKSHOPS
- UPGRADE OFFERS
- KEY FEATURES
- CONTACT DETAILS
- NEED TO KNOW





### INFORMATION

**System requirements** Windows 98SE or later, 30MB disk space, Office 2000 or later for Office integration

**Contact** [www.avanquest.co.uk](http://www.avanquest.co.uk)

**Registration** Point your browser at [www.avanquest.co.uk/vnu/expertpdf/register](http://www.avanquest.co.uk/vnu/expertpdf/register)

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**1** Expert PDF installs a virtual printer driver on your PC, so in most cases the pdf creation process starts by clicking File > Print. But there are a couple of exceptions. The program neatly integrates with Microsoft Word and Excel (version 2000 or later) and you may review its pdf file settings either from the Expert PDF menu or the program's own toolbar.



**2** Explore the settings: give your document a title, password protect it, choose a 'pixels per inch' value depending on whether it is for the web or commercial printing. Click 'Save As' to save settings for easy recall, then click File > Print and choose the Expert PDF printer driver. Check the Preview window and tweak the Expert PDF file settings as required.



**3** Click 'Show Viewer' and use the options to add text, images, links or whatever you need. Close the Viewer and your changes are saved automatically. Now leave the pdf print job in the Job window, where it can be combined with others, re-ordered and printed all in one file. Or just click Save to produce a complete, industry-standard pdf from your document.

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# Laplink Everywhere 4

Securely access your PC and all its data from anywhere in the world

Your PC is packed with vital information, which can be a problem if you need access to it while you're far away from home. Install Laplink Everywhere, though, and you'll be able to log in to your system from Internet-enabled PCs, PDAs or even some mobiles, no matter where you are in the world.

Once you have logged in, you can use your PC as though you're sitting in front of it. You'll see a window that displays the desktop and lets you browse the system, explore the Start menu and run applications just as normal.

The program also comes with specific support for Outlook Express and Outlook (version 97 and later), allowing you to access and update your email, calendar, contacts, tasks and notes. And a File Transfer module makes it easy to move files

from your main system to the remote PC, ideal if you've gone away and forgotten some vital data.

The most important part of any remote-access tool is its security, of course. You don't want anyone else using Laplink Everywhere to snoop around your PC, and the authors have gone to a great deal of trouble to keep you safe.

There's a password-protected user authentication system. The program doesn't require you to reconfigure your firewall or open any ports. You can create profiles for different users, limiting the drives or folders they can access. And 128bit SSL encryption keeps transmissions secure as they travel across the Internet, allowing you to use the system with confidence, knowing your data is safely protected from any potential snoopers.

## INFORMATION

**System requirements** Windows 98SE/ME/2000/XP, 6MB of disk space, Internet connection

**Contact** [www.laplink.com](http://www.laplink.com)

**Registration** Follow the instructions provided during installation

**Limitations** One hour of remote access per month, with a 12-month licence

## Get fast, secure access to your home PC from across the Internet



**1** Start Laplink Everywhere on your home PC, right-click on its system tray icon and select Open. Click Users & Sharing if you'd like to restrict remote access to particular folders and files. Click Settings > Security Options to optionally add another layer of password protection, and Settings > Email Configuration if you don't need remote email access.



**2** Leave your PC on, connected to the Internet and with Laplink Everywhere running in the background, then you can go to work or on holiday. When you want to check your email, review a file or otherwise access your system, visit [www.l12go.com](http://www.l12go.com) on another Internet-enabled PC and log in to the account you created during installation.



**3** Setting up a password that no-one else will guess is important when it's providing access to your entire PC. If in any doubt, click Account > Change Password and make it stronger. Then click My PCs, choose your PC, and choose the Remote Control service. Click Start, log in with your regular PC user name and password, and use your PC as normal.

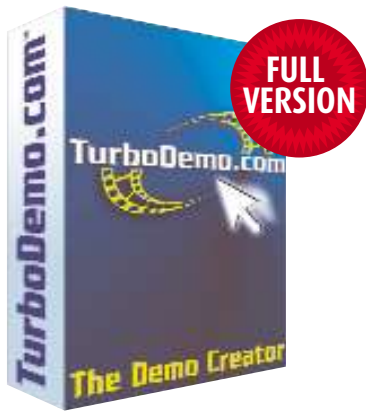
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# TurboDemo Standard 5

Get your message across with a stylish presentation

When you need to sell software, train others or offer technical support, it's tempting to create static documents: brochures, manuals, or thousands of words with the occasional screengrab. But if you install TurboDemo you can build animated presentations that convey your message much more clearly, showing people rather than telling them. Once you're familiar with the basics, creating a new demo only takes a few minutes.

The process starts with a screengrab stage. TurboDemo runs in the background while you run through the application to be explored, taking screengrabs by pressing the Pause key.

This gets you a collection of slides, one per grab, which will form the basis of your demonstration. Then you can get to work adding

extra content. This could include highlighting areas with a pointer or adding text notes to a grab. An audio option lets you record individual narrations for specific slides or attach sound files (wav format only). You can add a degree of interactivity with options such as the 'click area'; the user sees one message if they click in the area you highlight, another if they click elsewhere, useful for training.

When you've finished, it's time to export the completed presentation in Flash (swf) format. The program offers control over items such as the number of colours used in an image and the jpeg compression factor, which helps keep the swf file size to a minimum. There's even a helpful HTML page exported along with the swf file that lets you view the demo yourself and explains how to distribute it on a website or CD.

## INFORMATION

**System requirements** Windows 98 or later, 50MB disk space, Flash plug-in to view demonstration

**Contact** [www.turbotdemo.com](http://www.turbotdemo.com)

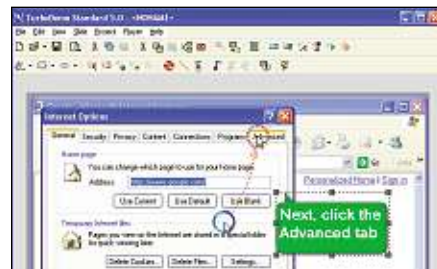
**Registration** Register your details at [www.turbotdemo.com/eng/vnu.php](http://www.turbotdemo.com/eng/vnu.php)

**Limitations** The menus include some options that are only functional in TurboDemo Professional

## Three reasons TurboDemo should be your favourite presentation builder



**1** The TurboDemo Screenshot Wizard automatically records your mouse movements for replay on the slides and captures a new screengrab every time you click the left mouse button. But if that generates too many grabs, the program is flexible enough to cope. Clear the 'Left mouse button' checkbox and collect grabs with the timer or by pressing the Pause hotkey.



**2** Each grab you take may be annotated to explain whatever point is required. Click View > Single Slide Mode, then Slide > Insert Balloon to add a speech balloon, for instance. Double-click this to enter a text caption, choose a font, text style and more. Repeat the process on other slides, adding further captions, text boxes, freehand drawings, and more.



**3** The finished presentation comes in a compact Flash file, ideal for use online. Click File > Generate a Flash Animation, give the demo a name, then customise it with a title, version, and perhaps your URL and email address. Use a small number of colours and experiment to find the lowest jpeg quality settings to keep your file size to a minimum.

## UPGRADE OFFER

### NEW FEATURES

Grab images and audio simultaneously  
Record keystrokes and mouse movements  
Add stylish slide transitions  
Make your demos interactive  
Easily edit slide narrations  
Publish in exe, Java, avi formats and more

## TURBODEMO 7

The latest version of TurboDemo can capture screengrabs and audio at the same time, speeding up demo development. Improved interactivity allows users to move between slides by clicking on areas you define, and the finished demo may be published in Flash, exe, Java, asf, avi, animated gif, Word or pdf formats.

The exact features you get depend on the version you buy, but we're giving you major discounts on them all: TurboDemo 7 is £139, down from £225; the Professional version is £209 (usually £299); and the Enterprise is £409 (normally £636). Find out more or order via [www.turbotdemo.com/eng/contact.htm](http://www.turbotdemo.com/eng/contact.htm).



## INFORMATION

**System requirements** Windows 98SE or later, Internet Explorer 5 or later, 15MB disk space

**Contact** [www.acdsystems.com](http://www.acdsystems.com)

**Registration** Not required

# ACD Fotoslate 3

Quickly print photo calendars, greetings cards or contact sheets

With high-quality digital cameras cheaper than ever, most people now have a large collection of photos archived on their hard drive. But if you never do anything with them, it seems like a waste. ACD Fotoslate helps you get more from your digital images by using them in creative projects such as CD sleeves, T-shirt transfers and greetings cards, or just printing them out in the precise size and layout you need.

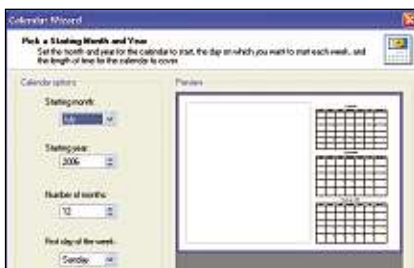
This doesn't mean you'll need to navigate through the complexities of desktop publishing, as Fotoslate is much easier to use than that. Start by using one of the Layout Wizards – the Calendar, for example – pick a paper size and style, and the program will create a layout for you. Drag and drop across whatever images you'd like to use,

and the program fills in each Calendar month page automatically. Finally, add some text captions if necessary, then print the results.

If you're willing to spend a little more time on your design, you'll find Fotoslate has even more to offer. The integrated Designer comes with 450 templates (calendars, CD and DVD inserts, contact sheets, photo albums, greetings cards and more) for 14 sizes of paper, for instance. If these still don't suit your needs, it only takes a moment to create your own.

Other welcome features include a simple image editor, capable of cropping or rotating images, adjusting colour, brightness or contrast, or applying special effects. Images can also be given drop shadows, have bevelled edges applied, or placed in a selection of stylish frames.

## Print a custom calendar with your favourite digital images



**1** Launch Fotoslate, click Start Layout Wizard and choose the Calendar option. Click Next, choose a paper size and orientation, then pick a calendar style that includes an image. Use the Preview window to get a feel for how it will look. Work through the wizard, setting the Start month for the calendar and the fonts you want to use, then click Finish.



**2** Click Add Images, then browse your system looking for photos to include in the finished layout. Double-click an image to select it and click OK when you have enough. Drag and drop each photo onto the image placeholder on the calendar page where you'd like it to be used. If an image is cropped, then right-click in and select 'Shrink to fit'.



**3** Right-click the calendar image and select Image Object Properties to add the final touches. Here you can add frames, drop shadows or perhaps crop the image into a circle rather than a rectangle. Check 'Apply to all image objects' to make your edits consistent for every photo, then click OK. Finally click File > Print, and enjoy your calendar.

## UPGRADE OFFER

### NEW FEATURES

New customised calendar features  
Rotate image objects freely  
Quickly re-order project pages  
Over 100 new photo frames  
More image shape templates  
Export projects in pdf format

## SAVE \$10 ON ANY ACD SYSTEMS PRODUCT

The latest version of Fotoslate comes with extras such as customised calendar features (remember holidays, birthdays, anniversaries and more), free image rotation, new image shape templates (put your photos in a star, heart, ellipse), pdf export and more.

Perhaps you'd prefer ACDSee 8, the company's powerful photo-management tool. Or you might want to try Canvas X, their industry-strength illustrator.

Visit [www.acdsystems.com](http://www.acdsystems.com) to explore the company's product range, and use the promotional code **VNU10OFF** on any order to obtain your \$10 (£5.70 approx) discount. **Offer expires on 31 July 2006.**

# Healthframe Explorer Lite

FULL  
VERSION

## UPGRADE OFFER HEALTHFRAME EXPLORER

Move to the standard version of Healthframe Explorer and you'll be able to print the program's many informative reports and graphs. Your medical records may be exported in XML, using standard medical codes (UMLS and ICD-9). Best of all, you're able to create multiple personal health records, which means you can use Healthframe Explorer for the whole family.

All these benefits could be yours for a mere £27.95. If this sounds interesting, click Health > Buy Healthframe Online to find out more or place an order.

### INFORMATION

**System requirements** Windows 2000/XP, Internet Explorer 5.5 or later, 40MB disk space

**Contact** [www.bluesquad.com](http://www.bluesquad.com)

**Registration** Not required

**Limitations** The Lite version allows records to be created for one person only

**The Calendar screen allows scheduling of visits to the doctor, tests or treatments**

Your medical records are a vital resource in managing your personal healthcare. Yet they're split between your GP, the local hospital, dentist, health centre – everywhere you've ever been treated. And you might be charged a fee every time you want to access one.

If you think this seems unfair, then you might want to give Healthframe Explorer a try. This easy-to-use program helps you build up a personal health record of your own, a permanent database of all your medical details, which will always be accessible.

Just collecting all this information in one place offers immediate benefits; for instance by keeping details of all your medical insurance policies in one

place. And there are major practical advantages in being able to record details such as immunisations. Now you don't have to try to remember when you had a tetanus jab and risk getting it wrong.

Then there's the journal function, letting you record conditions such as migraines, when and where they happen, what you were doing at the time and so on. Add enough details and it might help you, or your doctor, figure out the cause.

Reports are another benefit, recording changes in weight, cholesterol or perhaps blood pressure over time. And links to a US medical site keep you informed every step of the way. Put it all together and this really is an invaluable tool for everyone who cares about their health.

# Serif Mediaplus 1

FULL  
VERSION

ON OUR  
COVER  
DVD

## UPGRADE OFFER SAVE £20 ON MEDIAPLUS 2

Serif's latest version of Mediaplus can package your image into portable slideshows, which you can freely share with friends and family. Batch photo processing converts a bunch of images from one format to another (with extras such as compression, rotation, renaming) in a single step, and there's new support for viewing image Exif data.

All this can be yours for only £39.95, £20 off the usual price. For more information call 0800 376 7070 or +44 115 914 5454, quoting code **RO/PCW/MP1/0406**. Offer expires on 20 May 2006.

### INFORMATION

**System requirements** Windows 98 or later, 38MB disk space

**Contact** [www.serif.com](http://www.serif.com)

**Registration** Follow the instructions within the application

**The Explorer-like thumbnail view makes it easy to create themed albums of your favourite digital images**

For most people, managing their digital photos means wading through folders crammed with oddly named jpegs, and somehow hoping to find the shots they need. Serif Mediaplus aims to bring order to this chaos and ensure you'll never lose a favourite shot again.

At the heart of this new system is the Mediaplus Album, essentially a virtual folder where you can drag and drop whatever images you like. Create an album for Holidays, Family, Landscapes – whatever suits your collection. Any single photo can be included in as many different albums as you like, so you're not forced to make awkward decisions about where a shot belongs.

You can add tags to an image, including caption, author and keywords, along with a set of text notes. This could be used to label images with the people they include, the location, and so on. Then the integrated Search tool will examine these tags and locate all the pictures containing 'David' that were taken in 'France', for example.

Mediaplus can also help share your photos with others, via extras such as a contact sheet Print option, or a Publish to Web module that creates an HTML thumbnail gallery. Add a slideshow feature and the ability to make screensavers, and Mediaplus makes an ideal addition to any collection of graphics utilities.

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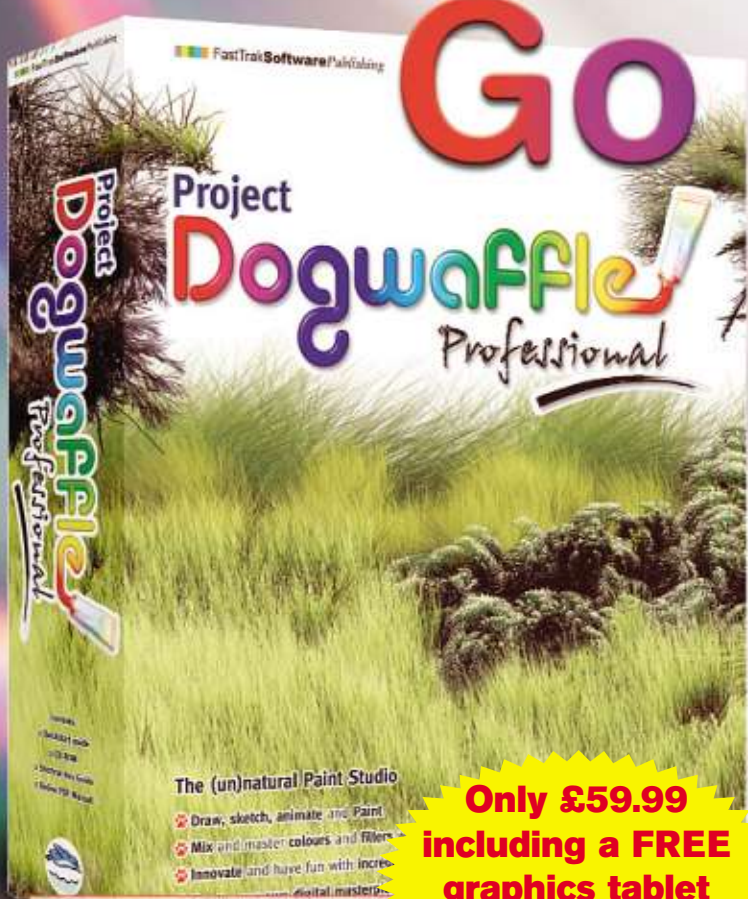
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Computeractive Issue 208

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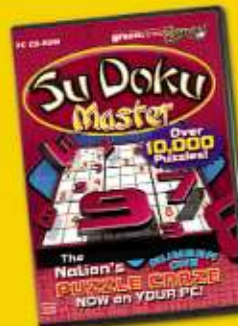
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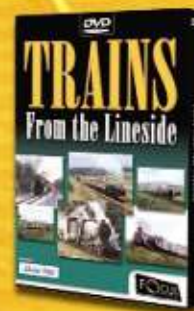
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# COMPETITION

## WIN! Elder Scrolls IV Oblivion & a Dell PC

To celebrate the release of Elder Scrolls IV Oblivion, 2K Games is giving one PCW reader the chance to win a copy of the game and a Dell Dimension 9150 desktop computer.

The latest chapter in the epic Elder Scrolls saga, Oblivion uses next-generation video game hardware to fully immerse the player in the experience. With a powerful combination of gameplay and graphics, you can unravel the main quest at your own pace or explore the vast, richly detailed world and find your own challenges.

The Emperor of Tamriel has died a mysterious and untimely death, and the throne lies empty. With the Empire ready to crumble, the gates of Oblivion open and demons march upon the land, destroying everything in their path. To turn the tide of darkness, you must find the lost heir to the throne and unravel the sinister plot that threatens to destroy all of Tamriel.

The game is packed with features such as a groundbreaking AI system that gives the non-player characters full schedules – they eat,

sleep and complete goals all on their own – and an all-new combat and magic system that brings role playing to a new level of intensity. You can create and play any character you can imagine, from the noble warrior to the sinister assassin.

The game supports pixel-shader effects and high-definition graphics to create extraordinary visuals, including lifelike towns, dungeons, and the most realistic forests ever created in a game.

2K Games is also giving away a Dell Dimension 9150 desktop computer on which to play this game.

Equipped with a 3GHz Intel processor, 1,024MB of DDR memory, 160GB of hard disk space, a 128MB ATI Radeon X300 SE Hypermemory graphics card and a crisp 17in monitor, it is the perfect

accompaniment to Oblivion. The lucky first-prize winner will receive the computer plus a copy of the game. Four runners-up will win a copy each of Oblivion.

For your chance to win a copy of the game and a great gaming PC, just answer the question and follow the instructions on how to enter.



In our April competition, Crucial 1GB Flash memory cards were won by Stewart Anderson, Mark Beecher, Joanne Bush, Maurice Foster, Balal Hussain, Peter Lamb, Brian Linford, Michelle Rayner, Michael Shields, Jane Stephenson, John Sweeney and Colin Wallace; 2GB PC3200 Dimm memory upgrades go to Richard Tsang and Winnie Yick; and a 1GB Gizmo Hi-Speed USB drive goes to Mark Carver, Christopher Neve, John O'Carroll, Ken Page and Harvey Roland. A Shuttle XPC System G5 8300M Media Center and XP17 monitor was won by Jim Wrench.

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### PCW 2K Games competition

#### How to enter

For your chance to win the prizes from 2K Games, tick the box next to the correct answer to the question below, fill in the coupon and send it to 2K Games competition, PCW, PO Box 10218, Sutton Coldfield, B76 1ZB by the closing date. Or go to [www.pcw.co.uk/competitions](http://www.pcw.co.uk/competitions) and follow the instructions. The competition opens on 20 April and closes on 19 May.

What is the main aim of the Oblivion game?

- a) To find the lost hare  
b) To find the lost heir  
c) To find the lost hair



Name: \_\_\_\_\_

Address: \_\_\_\_\_

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This competition is open to readers of PCW, except for employees (and their families) of VNU Business Publications and 2K Games. PCW is the sole judge of the competition and the Editor's choice is final. Offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18 and only one entry per household will be accepted. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. VNU will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. VNU reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. VNU will use all reasonable efforts to ensure that the prizes are as described on this page. However, VNU does not accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

We will use the details provided to contact you regarding this competition.  Tick box to receive information about products and services from the VNU Group by email.  Tick box to receive information about products and services from selected companies by email.  Tick box if you do not want to receive information about products and services from the VNU Group by post/telephone.  Tick box if you do not want to receive information about products and services from selected companies by post/telephone.

# On the web

[www.pcw.co.uk](http://www.pcw.co.uk)

PCW is not just a great monthly magazine, we also have a website carrying daily news, reviews, features, downloads, competitions and blogs written by us and our sister VNU titles. The website is updated daily, to help keep you abreast of the latest events and new products.



## The Test Bed

Our labs blog, the Test Bed, gives you regular updates on the latest gossip, technology trends and products. We also have a performance area, where test results can be compared so you can see how well rival products fare against each other. Our database of products makes it the most comprehensive tool you will find and the perfect complement to our Buyer's Guides and reviews.

→ <http://labs.pcw.co.uk> → <http://www.reportlabs.com/testbed>

## PCW Interactive

You may recognise some entries in this blog from our Letters pages, but they are published here first, letting you add your views and comments.

→ <http://interactive.pcw.co.uk>

## PCW Newsletters

If you want to keep up with the latest news, reviews, blogs, Hands on and software downloads then sign up for our weekly PCW email newsletter. It is published every Friday and gives you a selection of the highlights from the week. Our Products newsletter goes out on Wednesdays and includes the most important news stories and reviews.

→ <https://www.vnuservices.co.uk/pcw>

## PCW podcasts

We record a weekly podcast looking at our favourite products reviewed that week. Going live every Friday, it often also includes exclusive web competitions in which you can win the featured products.

→ <http://www.pcw.co.uk/podcasts>

## PCW tests and reviews

Our tests and reviews are independent, with no outside influence from manufacturers. Vendors are not allowed to see the results of our tests before publication, ensuring you can completely trust the independence of what you read.

Prices: All prices include VAT unless otherwise stated.

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# Personal Computer World

# NEXT MONTH

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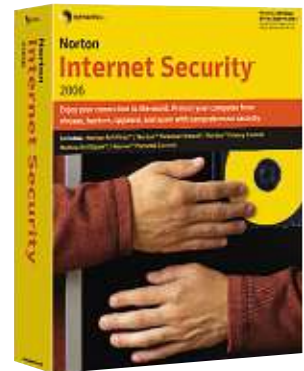
## Dual-core notebooks

Are two better than one? If you're talking about mobile processors, then the answer is a definite yes. Dual-core CPUs have finally made the move to notebook PCs, but they usually command a high price. We've scoured the UK for six of the cheapest models.



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Everyone uses it, but there are still lots of little-known tricks and tips to getting the best out of Ebay. Our comprehensive guide will help you buy and sell your products like an expert.



## Blu-ray and HD-DVD

The war between the rival contenders for the next generation of high-capacity optical storage is only just beginning. So why all the fuss about this new technology and why is it taking so long to get to market? PCW explains all.



There's lots more in July's PCW  
**DON'T MISS IT...**

# JUNE 2001

At the time this issue came out, PCW had already clocked up 23 years as a magazine and it was time for a redesign. Editor Riyad Emeran was getting nostalgic and reminisced about the magazine he grew up with. He remembered the days when he and his friends used to visit the 'magical place' that was the annual Personal Computer World show at London's Olympia (where all his saved money would somehow disappear in the blink of an eye).

Our cover model was Sony's answer to Apple's iBook; the Vaio notebook. We loved its value for money, stylish looks and individual design, but were concerned about the specs; it only had 64MB of Ram as standard, no DVD-Rom drive and the battery life was poor, lasting just over an hour in our tests. But its TFT screen was a 'joy to behold' and the retro styling of the keyboard also appealed.



From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

We introduced a new section called Test Drive, where our experts tested new equipment along with complete novices. It looked at the usability of products and how easy they were to use. First to be tested were PDAs, and our expert and novice had some very different thoughts on what was heaven and hell about these devices. Ex-PCW editor and Hands on columnist Gordon Laing wanted a device to write articles on, and one that could get online with a minimum of fuss, that is, with a built-in modem. His choice, the HP Jornada 720 was big, heavy and pricey (at £664) but started up immediately and had a long battery life. Trainee solicitor Heather Grimbaldston thought this too bulky to carry around, and instead opted for the stylish Palm Vx, which she would be 'proud to use in public' and considered reasonably priced at £280.

# JUNE 1981

Clive Sinclair's ZX81 was the inventor's third computer and, after the success of the ZX80, it was destined to match its predecessor's popularity among home users.

By modern standards it was very basic: only a 3.5MHz Z80A CPU, 1KB of memory (expandable to 16KB), a touch-sensitive keyboard and no sound and colour in sight. Like the ZX80, though, the sub-£100 price tag was its key selling point, and editor David Tebbutt reckoned it would do well in the home market.

He was right: the ZX81 sold millions.

David was busy throughout June, providing a report from that year's West Coast Computer Faire (sic). Among the new and odd sights was the Dynavite exercise bike that enabled you to watch yourself have a heart attack on an LED panel.

Back in 1981, some 20 years before the arrival of the truly digital home, Mike Gurr wired his whole home to a computer. The centrepiece was a voice-recognition device for opening the front door. It worked fine until he returned home one day to find that his house had a power cut.



# JUNE 1991

Fifteen years ago, the Mitac 4270E appeared 'out of the blue' to grace the cover of PCW. As Arif Raja tested the first 486SX-based EISA machine on the market, he was amazed by its processing speed and how Mitac, which started as an Intel distributor in 1974, was able to get everything about the machine right, so it performed beyond expectations.

Looking at how Americans shopped for computers and software, Wendy Grossman visited local stores

and software outlets, examined a computer recycling business and explored the rising trend of computer superstores.

In a collection of cyber-related short stories entitled Digital Dreams, David Barrett gathered fiction from respected sci-fi and fantasy authors including Terry Pratchett, John Grant and Alex Stewart. This enjoyable gathering of stories raised interesting ideas on topics such as God's ownership of a word processor, the right of artists to look down on computers and the question of whether technology isolates human beings from each other.



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